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TWO YEARS WORK IN NUMBERS

MINNIE E. PUNTENNEY

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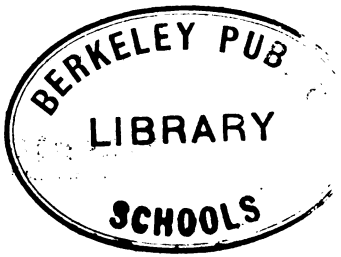
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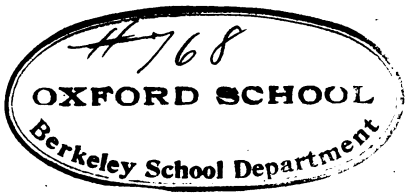
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OXFORD SCHOOL
Berkeley School Department

TWO YEARS WORK IN NUMBERS

TWO YEARS WORK IN NUMBERS

EXPRESSLY ARRANGED FOR FUNDAMENTAL ACQUIREMENT PRECEDING THE INTERMEDIATE GRADES

BY

MINNIE ETHEL PUNTENNEY

Head of Primary Training Department of Central State Normal
Edmond, Oklahoma
Lecturer in Teachers' Institutes and Chautauquas

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PREFACE

The purpose of this book is: *First*—to systematize the knowledge that the child has when he enters school; *Second*—to strengthen and develop his judgment; *Third*—to teach him to measure by using the simple units of measurement; *Fourth*—to lead him to discover, easily and logically, the fundamental number facts of addition, subtraction, multiplication and division; *Fifth*—to lead him to see the relation of these number facts to our everyday experience; *Sixth*—to help him to learn these number facts by pleasing repetitions; *Seventh*—to cause him to learn the fundamental processes by performing them.

This book contains the fundamental number facts and processes required to prepare the child for the study of any intermediate arithmetic. It is issued in two editions, the regular or pupil's edition, and the teacher's Manual. The two editions are alike, except that the teacher's edition includes pages ix-xxvi, which contain notes on Part One and Part Two, and an outline of the work for the half-year that precedes the time at which the

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regular edition is placed in the hands of the pupil. The book provides work for two years, but during the first half-year it is not to be in the hands of the pupil. The Author intends the work to begin at the beginning of the first-year grade, but the book may be used with just as good results in those schools where number work is not begun until the middle of the first year or the beginning of the second.

For these lessons the Author is indebted to the many hundreds of children and teachers whom it has been her pleasure to instruct. She is also very grateful to all her friends who have aided her in any way.

MINNIE ETHEL PUNTENNEY

Litchfield, Illinois
August 15, 1908

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It requires the patience of Job,
The wisdom of Solomon
And the love of God
To lead a little child aright.

EXPLANATORY AND SUGGESTIVE

INTRODUCTORY

Each formal science has a language. The language of form is drawing. The language of harmony is music. The language of measurement is mathematics. In each of these languages the mechanics requires much time. The mechanics of mathematics involves the fundamental number facts and the fundamental processes. The mechanics of each language *must* be learned; therefore, the plan of this book is to aid the child in learning the fundamentals of mathematics.

We may ask, What is the need of Mathematics? Why was a number system formulated? Simply because of the limitation of quantity. If there were an unlimited amount of quantity, no measurement would be required. Then we must agree with McLellan and Dewey (The Psychology of Number) that the Number Idea has its origin in measurement. But what must we know in order to measure? We must have a clear conception of the unit of measure. We must know the process of finding the ratio of one quantity used as the unit of measurement to another quantity to be measured.

For convenience, a number of these facts, thus discovered, have been arranged in groups called tables. These tables must be learned. Only 45 addition facts, 64 multiplication facts, and double the number of subtraction and division facts, a few tables of measure, and the fundamental processes with practical applications, make the sum total of primary number work.

When a little child enters school, he knows a great many scattering facts. His experience has taught him a few number facts. He is able to *imagine* and to *memorize,* but is able to do *very little reasoning.* His curiosity leads him to

want to discover. Therefore, the principal work of the *primary teacher* is to lead the child to *discover* and to *think logically.* While he is discovering and thinking, he will *necessarily* learn *many useful facts.*

The exercises throughout the book are planned to lead the child to discover cheerfully, to think willingly, to image easily, to memorize readily, and to do accurately. All modern psychologists agree that the motor activities intensify the sense activities, hence the motor sensations intensify the sense images. If the brain receives the sensation through the ear, the eye and the hand, the impression is much deeper than the sensation received through the ear only.

SOURCES OF MATERIAL

In the reading lessons, both from the board and the book, let the children count the words that are alike. This serves a two-fold purpose. The child loves to count. Each time he counts the word he images the word and it soon becomes one of his mental pictures. Children also love to count the lines in the reading lessons, the words in the spelling columns, the objects in the pictures.

Let the children count the boys in the school room, the girls in the room, the boys and girls in each row of seats, the boys and girls in groups, the children at the blackboard, etc.

A number of counting lessons may be given in connection with the distribution of material, also in connection with plays and marches.

Assist the children in keeping a weather record. A simple device is a series of circles drawn on the board. Designate the portion of the day that is clear, cloudy or stormy. A great deal of number work may be gotten from the above device. Have a thermometer in the room. Allow the children to learn to count from it.

Do not lose sight of the number work in Nature Study as well as in all observation work. In the construction work use

such mathematical ideas as surface, square, rectangle, triangle, corner, side and edge. In the paper folding, teach the right and left side by referring to the right or left hand. A great many number computations are used in connection with the *making* of things. Always take advantage of these opportunities to teach practical number work. Make the school life of the child a real life. Let him live a natural life in his school work. Allow him to do things that will make him a thinking and useful citizen.

At this stage of development, the child is not capable of forming concise and exact judgments; therefore, a number of exercises have been arranged for the teacher's use. These first exercises give work that requires what we may term indefinite or loose thinking. As the teacher proceeds with the exercises the child is led to see equalities and hence to think and to reason concisely and accurately. Ruskin says, "Finish is ruinous because it sacrifices better things than finish." That is, the *process* of *learning* is more important than the *finished product; logical thinking* more important than the *facts learned.*

The Suggestive Lessons on pages xiii-xxii are symply type lessons to be varied and multiplied at the discretion of the teacher. A great variety of these exercises may be given and a great deal of valuable information and training derived therefrom. They contain the three great mathematical ideas, namely, the solid, the surface and the line. These ideas are taught in such a simple way that the child grasps them and thus lays a broad foundation for his higher work. They also give a fine opportunity for language training which is so necessary for logical thinking. For instance, in measuring two sticks the child is led to say, "This stick is longer than that stick." In measuring three sticks he finds one to be the longest and another to be the shortest. In comparing two oblongs—one two inches long and the other four inches long—if we call the two-inch oblong *one,* we call the four-inch oblong *two.* If we call the four-inch oblong *one,* we call the two-inch oblong *one-half.* This class of work leads the child

to discover finally the great mathematical principle that the value of a number depends upon the unit of measure. It is suggested that much attention be given to the language of mathematics after the child has been in school a sufficient time to feel at home and express himself freely. Gentle criticism is always the best.

Do not tell the child to memorize, but if he follows the directions given in the exercises he will *learn* the important facts by *doing.* As soon as the child is capable, allow him to copy the facts to be learned; to copy a fact from three to five times before copying the next one. There is a strong pedagogical reason for this.

SUGGESTIVE LESSONS

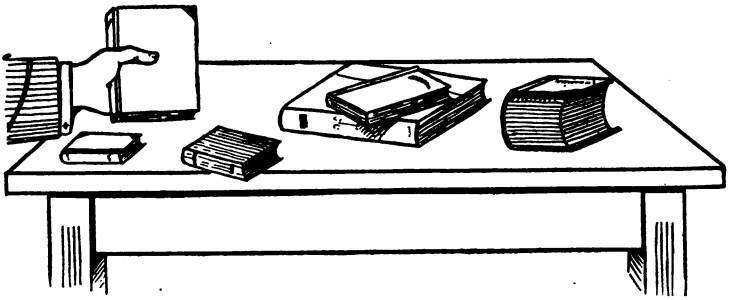
Note: The number work of the first half year is to be presented by the teacher, the book not being placed in the hands of the pupil until Part One is reached, which will be at the beginning of the last half of the first year. The work to be presented by the teacher during the first half of the year is that indicated in the discussion on "Sources of Material" (pages x-xii) and that outlined in the Suggestive Lessons which follow. The teacher, of course, will enlarge upon this material as she may deem necessary.

THINKING EXERCISES

The material below forms a basis for several lessons:

Let us look at this book. (Holding a book in the hand.)
Name things in the school room that are larger than this book.
Name the things smaller than this book.
Name some things in your home that are smaller.
Let us look at this desk. (Teacher's desk.)
Name things larger that you saw as you came to school.
Name things at home larger than the desk.
Name some things in the room that are smaller than this chair.
Count the windows and window panes.
Count desks. Count books on the teacher's desk.
Count the planks in the floor.
Let us see how far each one can count.
Get pages of children's pictures from catalogues, and let the pupils count the objects and, for seat-work, allow them to color some of the pictures.

INDEFINITE MEASUREMENTS



Look at this book. (Pointing to the one in the hand.)
Find a larger one in the picture.
Find one a little smaller.
Find the smallest book.
Find the largest book.
How many large books?
How many small books in the picture?
Let a pupil take a book from the desk.
Find all the books larger than this one.
Find the books smaller than this one.
Count the larger books.
Count the smaller books.
Tell a nice story to create an interest in books.
Make the pictures on the wall the basis of a lesson similar to the one above.

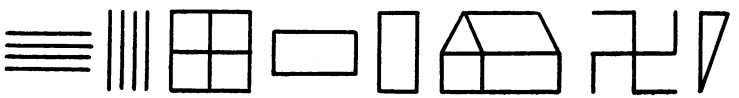
Let each child bring a box from home.
Place the boxes on the table.
Find the largest box.
Find the next largest box.
Let the pupils compare these boxes.
(Watch the pupil's language and try to have it improve constantly, but do not embarrass him in doing this.)
Find the smallest box.
Let a pupil compare this box with the largest box.

Let pupils compare other boxes.
Think of things at home smaller than the largest box.
Count the large boxes.
Count the small boxes.
How many all together?
Take four-inch squares and make boxes for seat work (see Exercise 9).
Vary this work for several lessons.

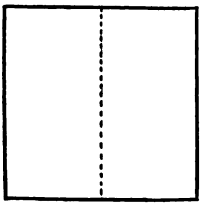
The material that follows will form a basis for a number of lessons:—

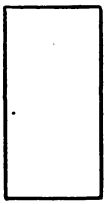
Explain *edge* by use of book.
Find edges a little longer than this edge (pointing to the edge of the book).
Find edges much longer than this edge.
Explain horizontal and vertical lines.
Draw a book and show that edges are represented by lines.
A horizontal line is a "lying-down" line.
A vertical line is a "straight up-and-down" line.
Find all the vertical lines in the school room.
Find all the horizontal lines in the school room.
Count ten horizontal lines.
Count 10 vertical lines.
Count horizontal lines in the windows.
Count the vertical lines in the windows.
Let the children use colored sticks to make figures having horizontal and vertical lines.

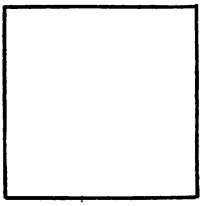
Make the following figures on the board and have the pupils represent them with colored sticks or tooth-picks.



Allow children to do original work in laying the sticks.
Never lose sight of the artistic.







The following lesson is suggestive only:—

Take a square of paper.
Hold your paper up in front of you.
How large a square have you?
How many corners? What kind?
How many sides has your paper?
Point to the upper edge. Lower edge.
Show your right hand. Left hand.
Point to the right edge of your paper.
Point to the left edge of your paper.
Point to the upper left corner.
Point to the lower left corner.
Hold your paper by the right edge; then by the left edge.
Fold these edges together. Crease.
What is the shape of your paper?
We may call it a ————. Keep the book and read a nice story from it.
Have the children think of the story for the next day.
The following day make some pretty drawings in the book.

Do you know how men measure these edges?
They use a foot ruler and a yard measure.
A ruler is a foot long. (Give each child a ruler.)
It takes three rulers to make a yard.
Use rulers and yard stick to illustrate.
Take your ruler and measure this edge of the book.
It is not a foot long.
We must learn what these marks mean on the ruler.
Count 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12.

Each space between the long black lines is —— inch. How many spaces are there?

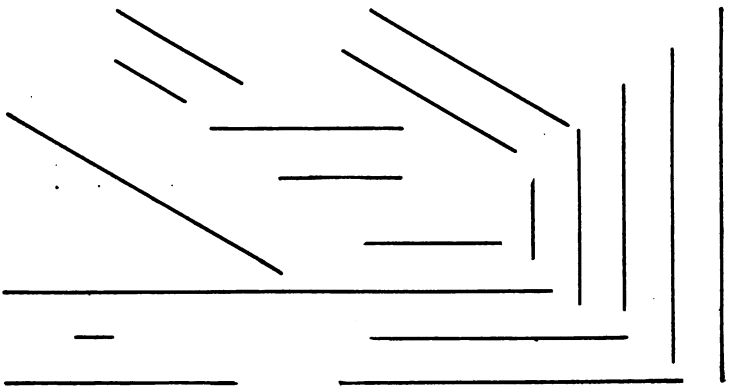
How many inches on a ruler?

——— inches make a foot.

Let children lay their inch squares by the ruler.

Get pages from catalogues and let the children count the pictures of men and women and then color them.

LINEAR MEASUREMENTS



Find the longest vertical, or up-and-down, line.

Find the next longest; the next longest.

Find the shortest horizontal, or lying-down, line.

Find the next shortest; the next, etc.

Find the longest slanting line.

Find the next longest; the next; the next.

Count the vertical lines.

Count the horizontal lines.

Count the slanting lines.

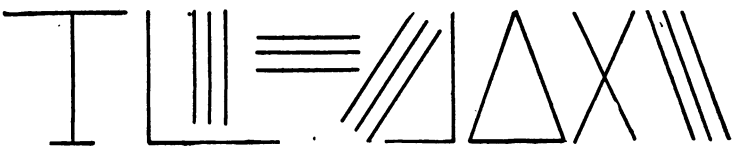
Count all the lines.

Draw similar lines on the board. Give the children much drill in judgment forming and measuring.

LENGTHS

Prepare a dozen rough-cut sticks.
Find the longest stick; the shortest.
Find the next longest; next shortest; etc.
Find two sticks of the same length.
Take the two sticks in your hands.
This stick is ———— than this one.
Measure the longest stick.
It is ———— ———— long.
Measure the shortest stick.
It is ———— ———— long.
Measure the edges of teacher's desk.
Measure the edges of children's desks.
Measure the width of the door.
We measure things with the ———— ruler and the ———— measure.

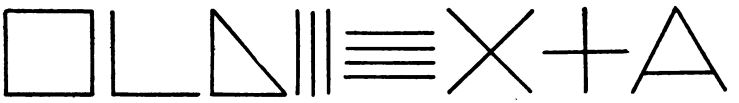
Make the following with colored sticks and draw with crayons:



The exercise that follows is a drill in getting the correct idea of length:—

Hold your hands 1 foot apart.
Let the teacher take a ruler and measure the space between your hands. If your hands just touch the ends of the ruler you "win the game."
Hold your hands 2 feet apart. (Let the teacher measure by placing 2 rulers together.)

Hold your hands 6 inches apart. Measure.
Hold your hands a yard apart. Measure.
Hold your hands a foot and a half apart. Measure.
Do not use ruler except to measure.
Draw on the board a line 2 feet long. Measure.
Draw a line one and a half feet long. Measure.
Draw a line 6 inches long. (Use half of a ruler.)
Give children much practice in drawing the horizontal, vertical and slanting lines on the board.
With your sticks at your desks, make the following figures:



SURFACES

Explain *surface* by the back of the book.
Find smaller surfaces than this surface. (Point to the surface of the book.)
Find little larger surfaces than this surface.
Find much larger surfaces than this one.
Find surfaces of teacher's desk. Count them.
Count surfaces of seats in the room.
Count surfaces of desks, chairs, etc.
Count surfaces of windows.
Think of surfaces at home, larger than the top of child's desk.
Think of surfaces at home, smaller than the top of child's desk.
Think of surfaces you saw coming to school, larger than the window; smaller than the window.

A number of lessons may be formed from these suggestions. Allow the pupils free activity in moving about.

Have many kinds of paper surfaces on the table.

Find the largest oblong or rectangle.

Find another like it.

Find the smallest oblong.

Find another like it.

Find the largest triangle.

Find another like it.

Find the smallest circle.

Find another like it.

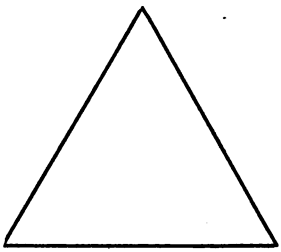
Find a red circle.

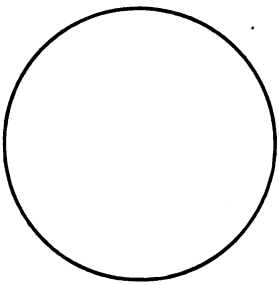
Find another just like it.

Find a green square.

Find another just like it.

Find a red triangle.



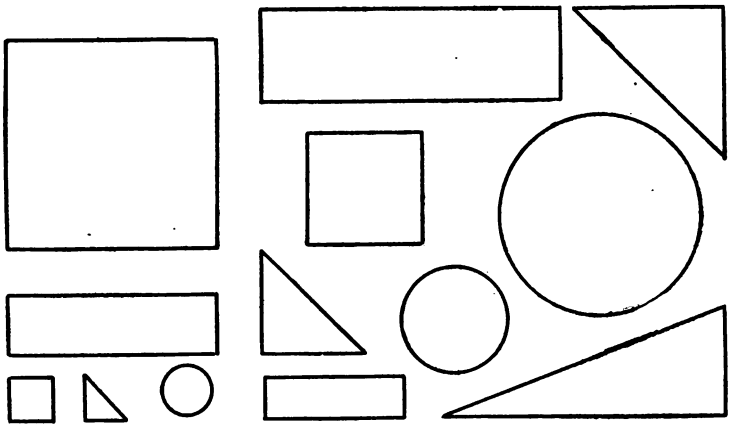


Let the children draw the oblongs and squares and color them. Furnish patterns.

Draw different sized oblongs on the board for one lesson. Give another lesson on triangles; another on circles; another on squares.

(A box of colored tablets will prove useful to the teacher.)

INDEFINITE MEASUREMENTS OF SURFACES



Find real surfaces similar to these figures.
Find the largest square in the picture.
Find the largest rectangle.
Find the next largest rectangle; the next.
Find the largest triangle.
Find the smallest triangle.
Let the pupils compare the two.
Find the largest circle.
Find the smallest circle.
Count the squares. Count the circles.
Count the triangles. Count all the figures.
Draw the figures and color them.
Allow the children to use patterns. They like to trace designs and to color them.

Cut, or have cut, a number of oblongs one inch wide and two inches long; one inch wide and three inches long; one inch wide and four inches long; one inch wide and six inches long;

one inch wide and eight inches long; one inch wide and nine inches long.

The teacher may use these in many profitable ways. For instance, take the two-inch oblong in one hand and the four-inch oblong in the other hand, saying, "If I call this one (holding up the 2-inch oblong) *one,* I'll call this one (holding up the 4-inch oblong) —— ——. Again: If I call this one (holding up the 4-inch oblong) *one,* I shall call this one (holding up the 2-inch oblong) ——. A great variety of comparison work may be done with these simple materials.

Cut or have cut a large number of narrow strips to use in the development of the beginning number work. A great deal of measuring work may be done with the strips. They may be broken in equal parts for work in fractions. They may also be used for design work.

Materials in number work are only means to an end. Let them be simple and inexpensive.

In teaching the addition facts, use, first, the following form: $\begin{array}{r} 6 \\ 2 \\ \hline 8 \end{array}$ Later on use this form: 6+2=8. Have many sight drills on the addition combinations, using the first form given above. Subtraction facts may be learned by the same plan (see exercise 27).

NOTES ON PART ONE

Note: The first half of the first year that the child devotes to the study of mathematics is to be given to the work indicated in the discussion on "Sources of Material" (pages x-xii) and to that contained in the "Suggestive Lessons" (pages xiii-xxii). As stated before, all the preceding work is to be presented by the teacher. The formal number work for the child begins with Part One, and previous to this time the book is not to be placed in his hands.

Notice the close grouping of objects in Exercise 1. Distinguish the idea *three* from *three ones*. Let the teacher keep the twofold idea of *number* in mind,—the "how much" and the "how many;" the "content" and the "ratio." Also notice that the exercises on each new number use ideas that are naturally associated with that number.

It is presumed that the child knows the colors and their names. The teacher will kindly assist in reading the lessons. This will not detract from, but add to the interest in the number discoveries.

Observe suggestions for seat work as they form a part of the plan of the book.

If possible use objects as suggested. You will discover that the inch squares have been used more frequently than any other one kind of objects. Let the children call the inch squares many different things; as cows, horses, chickens, and fruits. Use the inch squares to show all the "pairs" of each number up to 20. Supplement the lessons by much blackboard work.

Vary the work as suggested in Exercise 3. Place vertical, horizontal and slanting lines on the board. Let the children

lay sticks to represent the lines on the board and then have them draw these lines with colored crayons. For Exercise 8 use an apple. For Exercise 7 use a yard stick and a foot ruler. Let children make large boxes for use in taking care of objects for their number work. For Exercise 11 use the measures if possible; if not possible, use drawings on the board to emphasize the drawings in the book. Also use drawings to aid the pupils in computing the problems which use the units of measure. Let the child do much comparison work as suggested in Exercise 12. The children enjoy the building lessons in Exercise 13. Make baskets any size you wish, as planned in Exercise 14. Develop the signs as suggested in Exercises 18, 24, 43.

Let the childrn draw fruits and vegetables on heavy paper. Color the drawings. Cut them out and use them during the winter for fruit sales as suggested in Exercise 20. Use the buying and selling game frequently. Often have *tests, reviews* and *drills*. Notice how the multiplication table is formed in Exercise 25.

Let the children make dominoes as suggested in Exercise 29. Use these dominoes for drill work in addition and subtraction. They may be used as checks with which to draw the toy money from the bank. Let the small children buy and sell, paying one cent for their objects. This gives much practice in counting by ones. Then they will learn to count by twos, threes and fours as the work advances.

If the little children cannot make the strips as suggested in Exercise 30, allow the older children to make them for the little ones. The great spirit of modern education is contained in the expression, "Help ye one another."

Notice how the multiplication table begins in Exercise 43 and that the same plan is carried through the book.

After the child has mastered the multiplication table in this form, allow him to make the tables of 2's, 3's and 4's as the work advances.

NOTES ON PART TWO

Kindly study carefully the Preface, Explanatory and Suggestive, and Part One before beginning work on Part Two. You will find that such study is a direct and necessary preparation for the successful teaching of Part Two.

Use carefully the device in the first exercise of Part Two. Use all the ideas given in this exercise to impress the child that eleven is one *ten* and one *unit*. Also lead him to see that it requires two or more places to write the numbers above 9.

Let the children use the "buying and selling" game often. Do not forget to review and drill. Give a number of lessons using toy money. Use work in Exercise 13 often,—until the forty-five addition facts are mastered. Give much work as suggested in Exercise 80. This work will prepare the child for short division. It is as necessary for the child to recognize 22 as the multiple of the two factors 11 and 2 as it is for him to know that 2 times 11 are 22. For instance, if he is dividing 24 by 11 he must see the multiple 22 before he can get the answer 2. In teaching the multiplication facts $8\times3=24$ and $9\times4=36$, give the following forms: $8\times3=?$; $9\times4=?$; $8\times?=24$; $9\times?=36$; $?\times?=24$; $?\times?=36$.

Drill on multiplication and division at the same time, just as you teach subtraction by addition. If the child knows the two component parts of a number he can subtract or divide as readily as he can add or multiply. Kindly use the plan of the book to teach the multiplication table.

If the child cannot make the concrete problems asked for in exercise 89, give more work on the preceding exercises.

Part Two of the book may be continued in the Third Grade if so desired. Follow the same plan, using a variety of material to teach these fundamental facts and processes. Have

the pupils write the figures, words and Roman numerals as you take up the new numbers. Use the form in Exercise 97. Insist upon the moving of the inch squares just as you direct. Show the difference between a row and a column. The inch squares may be cut at any printing office.

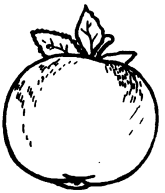
PART ONE

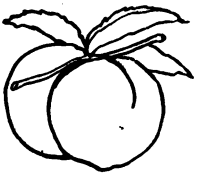
MINUTES

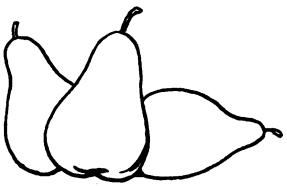
We are but minutes, little things,
Each one furnished with sixty wings,
With which we fly on our unseen track,
And not a minute ever comes back.

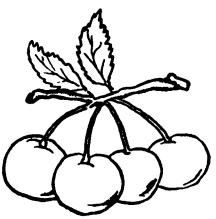
We are but minutes, use us well,
For how we are used you must one day tell;
Who uses minutes has hours to use,
Who loses minutes whole years must lose.

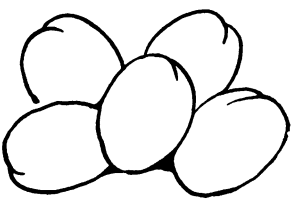
Exercise 1

1  one

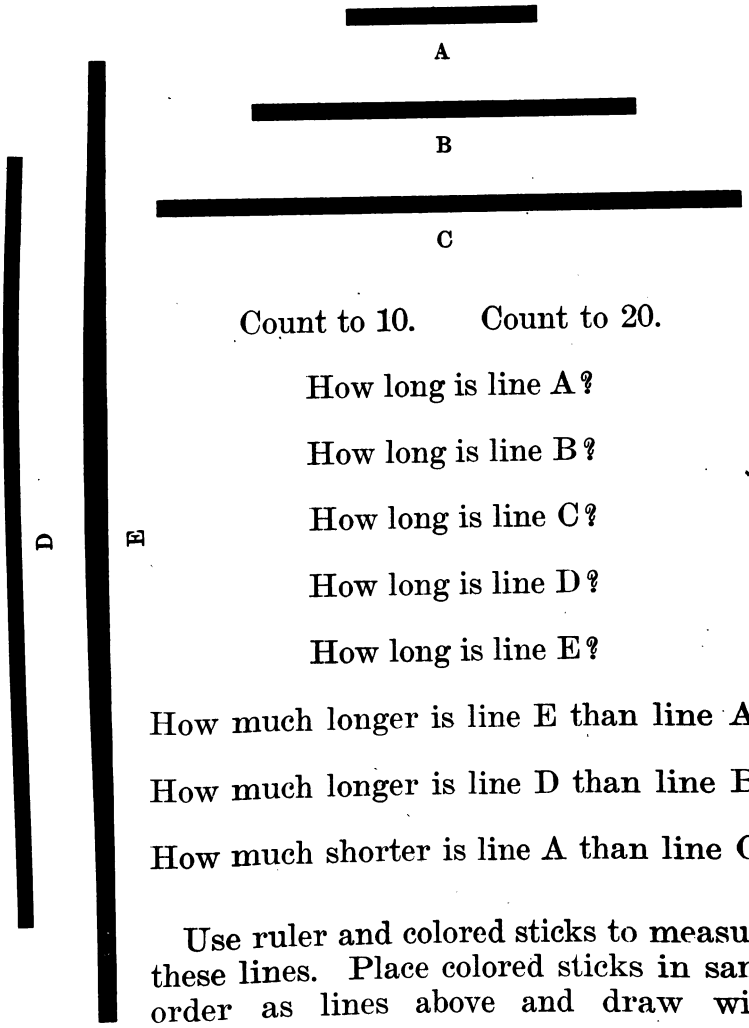
2  two

3  three

4  four

5  five

Exercise 2



Count to 10. Count to 20.

How long is line A?

How long is line B?

How long is line C?

How long is line D?

How long is line E?

How much longer is line E than line A?

How much longer is line D than line B?

How much shorter is line A than line C?

Use ruler and colored sticks to measure these lines. Place colored sticks in same order as lines above and draw with crayons.

Exercise 3

Have colored sticks on the table.

Teacher takes a 5-inch stick.

Find a stick as long as this one.

Measure sticks each time after choosing. Use ruler if you wish.

Take a 2-inch stick. Find one just like this.

Take a 3-inch stick. Find one just like this.

How long is each stick? How many sticks have you now?

Count all the sticks the children have.

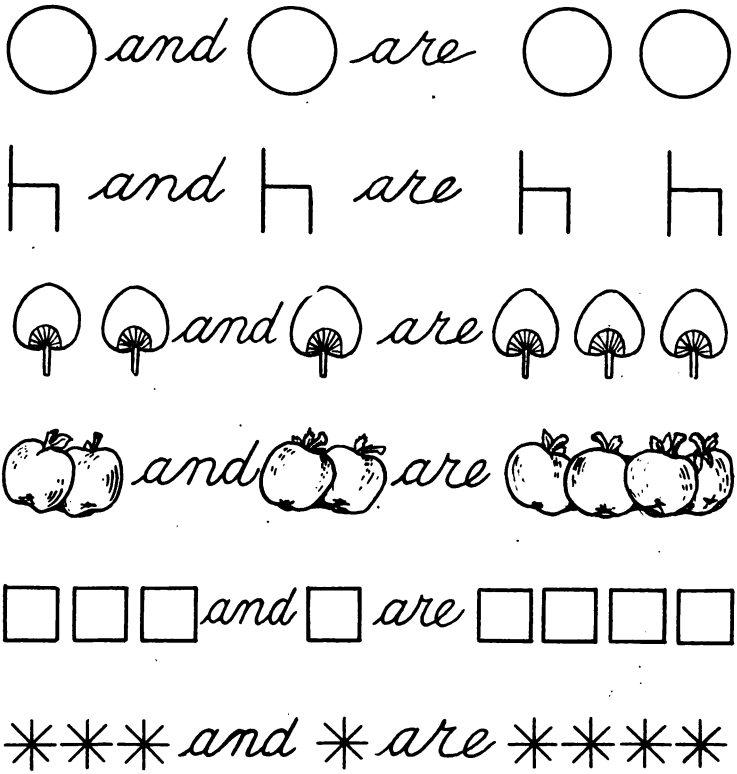
(When the child gets the correct stick he wins the game.)

(When he does not, the teacher wins the game.)

Count to 50 and backwards.

NOTE:—Vary this work in a number of ways.

Exercise 4



We have —— head.

We have —— nose. We have —— mouth.

We have —— eyes. We have —— hands.

We have —— arms. We have —— feet.

—— gloves make a pair. —— shoes make a pair.

Copy the drawings in this exercise.

Exercise 5.

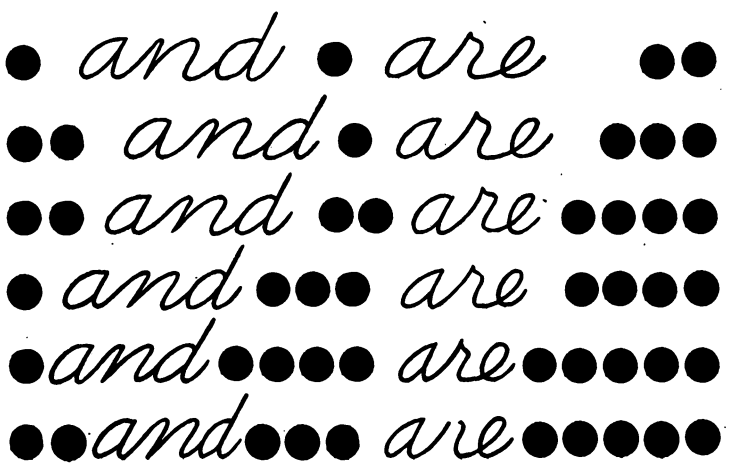
Copy the following number facts:

1	2	3	2	3	4
1	1	1	2	2	1
2	3	4	4	5	5

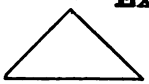
Write:

1 2 3 4 5 6 7 8 9 10

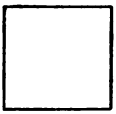
1 inch and 1 inch are —— inches.
2 inches and 1 inch are —— inches.
2 inches and 2 inches are —— inches.
3 inches and 1 inch are —— inches.
3 inches and 2 inches are —— inches.
4 inches and 1 inch are —— inches.
3 fans and 2 fans are —— fans.
4 chairs and 1 chair are —— chairs.

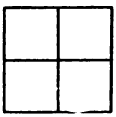


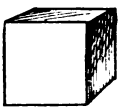
Exercise 6

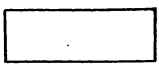
A  has —— sides.

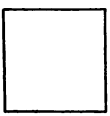
A has —— little leaves.

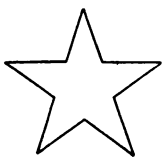
A  has —— sides.

A  has —— panes.

A  has —— sides.

An  has —— sides.

A  has —— corners.

A  has —— points.

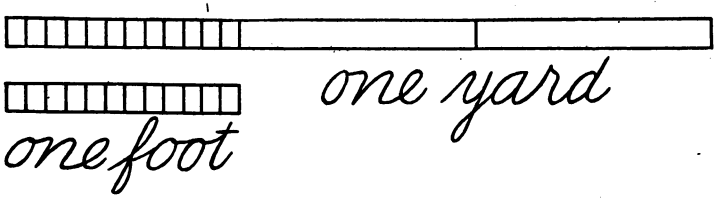
A has —— fingers.

Name 4 kinds of leaves. Bring other leaves and count their points.

Of what does a triangle remind you? Of what does the square remind you?

Find similar surfaces in the room.

Exercise 7



The long stick is a yard stick. It is a yard long.

A yard is —— feet long.

One-third of a yard is —— foot.

One-half of a yard is —— foot and —— ——.

One foot is —— —— of a yard.

Two feet are —— —— of a yard.

Three feet are —— —— of a yard.

We measure feet with a ruler.

A ruler is a foot long.

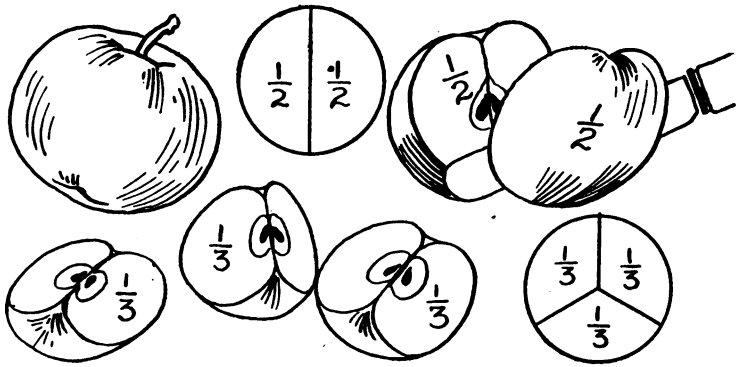
—— rulers laid end to end make —— yard.

A yard is —— —— long.

Name five things we measure by the yard.

Name five things we measure by the foot.

Exercise 8



We have an apple in the picture.

If we cut our apple into two equal parts we call each part one-half.

One-half of an apple and one-half of an apple make one whole apple.

If we cut our apple into three equal parts we call each part one-third.

One-third and one-third make two-thirds.

One-third and one-third and one-third make the whole apple.

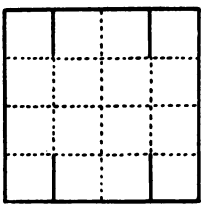
How many thirds make a whole apple?

NOTE:—Let the children cut other whole things into halves and thirds.

Exercise 9

PATTERN FOR A BOX

Take a 4-inch square. Lay this square even with the edge of your desk. Fold lower edge to the upper edge. Crease and unfold. Fold right edge to left edge. Crease and unfold.



Box

How many squares have you now? What part of the large square is the small square?

Crease and unfold after each folding.

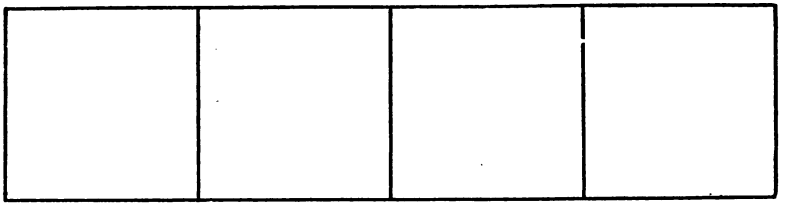
Fold the lower edge to the middle; upper edge to the middle; left edge to the middle; right edge to the middle.

How many squares have you now?

Cut the paper where the heavy marks are in the picture. Fold the corner squares inside and paste them.

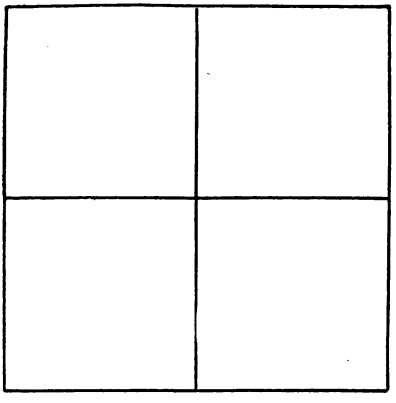
How many corners has your box? How many edges? How many faces? Which is the largest face? How much larger? Point to the longer edges? How much longer are they?

Exercise 10



I have four one-inch squares in a row.

My row is —— inches long and —— inch wide.



2 square inches and —— square inches are —— square inches.

½ of 4 square inches is —— square inches.

Move one inch square below.

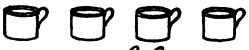
3 square inches and —— square inch are —— square inches.

We have —— seasons. Name them.

Name 4 things used on the farm. Name 4 things we get from the farm to eat.

Arrange colored squares in designs, trace the squares and color them.

Exercise 11

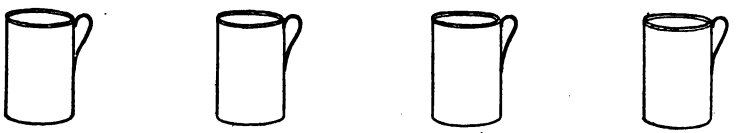


4 gills make

1 pint

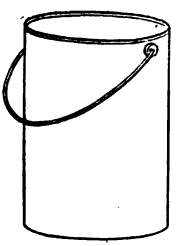
2 pints make

1 quart



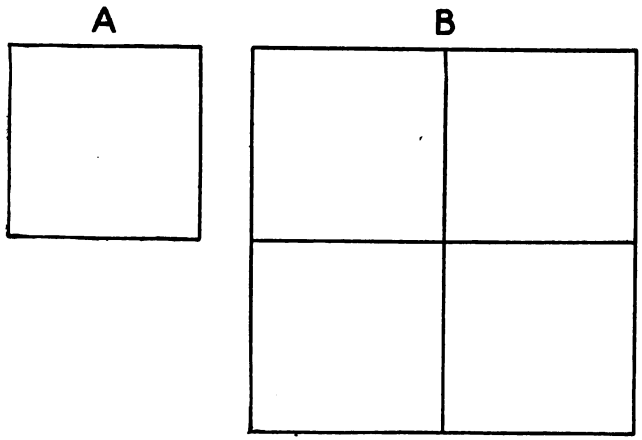
4 quarts

make



1 gallon

Exercise 12



The square A is an —— square.

The square B is a —— —— square.

Each side of square A is —— inch.

Each side of square B is —— inches.

The squere A has —— corners.

The square B has —— corners.

The square A is —— square inch.

The square B is —— square inches.

How much larger is square B than square A?

Draw the squares and color them.

Exercise 13

Use small objects for pigs and chickens.

Build a pen with four sides, four sticks high.

Put four pigs in the pen.

Feed each pig four grains of corn.

Let the pen down at one corner.

Drive one pig out.

How many pigs in the pen?

Drive 2 pigs out of the pen.

How many pigs in the pen?

Build another pen with five rails.

Put five chickens in the pen.

Feed each chicken five grains of corn.

Let the pen down at the corner.

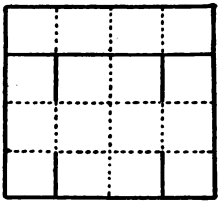
Drive three chickens out of the pen.

How many chickens in the pen?

Drive out two chickens.

How many chickens now?

Exercise 14



Would you like to make a basket?
Fold your square just as you did for your box.

Cut one row of squares off. How many squares have you cut off?

How many squares have you now?

How many corners? How many edges?

Now cut your oblong as you did for the box.

Fold corners inside and paste.

Cut a narrow handle and paste on the inside.

Name 4 things that baskets are made of.

Name 5 things that we carry in baskets.

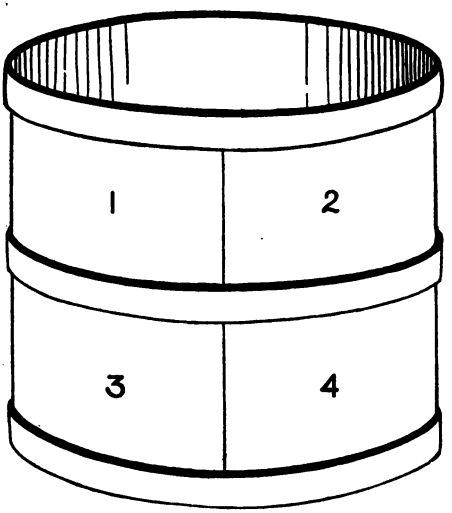
In what kind of business do men use baskets?

What would you like to put in your basket?

Write the following:

square basket edge

Exercise 15



A Bushel

4 pecks make 1 bushel.

2 pecks make one-half bushel.

2 pecks and 2 pecks make —— bushel.

3 pecks and 1 peck make —— bushel.

Name things we measure by the peck and bushel.

Count to 50.

Write:

peck bushel gallon

Exercise 16

1	2	2	3	2	4
1	1	2	1	3	1
2	3	4	4	5	5

We call these the "pairs" of 2, 3, 4 and 5.

Count to 100.

Go to the board and show the pairs of 4 with dots.

Make short vertical lines to show the pairs of five.

Make circles to show the pairs of 4.

Two pairs of shoes are —— shoes. Two pairs of gloves are —— gloves.

Two pairs of eyes are —— eyes. Two pairs of hands are —— hands.

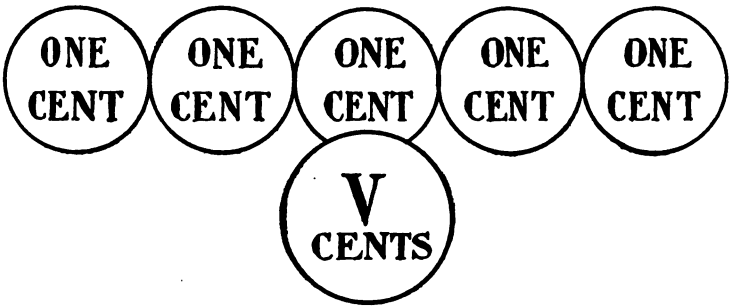
John had 4 shoes and gave one pair to a poor boy. He then had —— shoes.

Paul had 5 pencils and lost 2 of them. He now has —— ——.

Write these numbers:

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20.

Exercise 17



Five pennies make one nickel.

Count by 5's to 50.

—— one-cent pieces make a nickel.

3 cents and 2 cents are —— cents.

4 cents and 1 cent are —— cents.

5 cents less 2 cents are —— cents.

5 cents less 4 cents is —— cent.

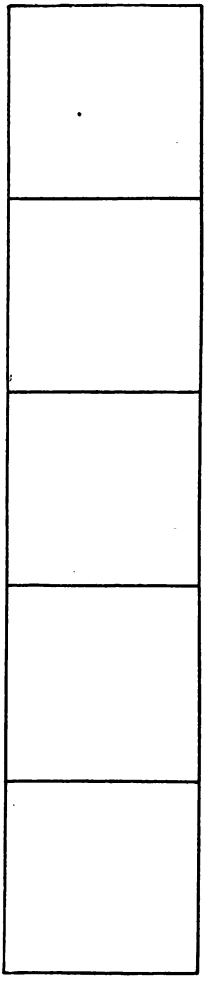
2 nickels are one dime.

5 dimes less 2 dimes are —— dimes.

5 dimes less 3 dimes are —— dimes.

A nickel is —— cents. A dime is —— nickels.

Make one-cent pieces and five-cent pieces for future use in buying and selling.



Exercise 18

We have five inch squares in a row. Move one inch square below. 4 inch squares and —— inch square are —— inch squares.

Move two inch squares below. 3 inch squares and —— inch squares are —— inch squares.

3 and 2 are ——.

3 + 2 are ——.

3 + 2 = ——.

5 less 3 are ——.

5 − 3 are ——.

5 − 3 = ——.

\+ means *and*. − means *less*.
= means *are* and sometimes *is*.

Write:

2	3	2	3	4
1	1	2	2	1
3	4	4	5	5

Exercise 19

(1) We can buy —— two-cent stamps for four cents.

(2) We can buy —— penny pencils for four cents.

(3) Mary had 5 nickels and lost two of them. She now has —— nickels. She can buy —— pencils at 5 cents apiece.

(4) For one nickel we can buy a tablet. Two tablets cost —— dime or —— ——.

(5) James has 2 pets in one room and 3 in another room. In both rooms he has —— pets.

(6) The mother hen had 5 little chicks. 4 of them died. She now has —— chick.

Write pairs of the numbers 2, 3, 4 and 5.

Exercise 20

A FRUIT SALE

Let each child bring fruit for the sale.

Use pennies made by the children.

What are the prices of bananas and grapes?

"I want a banana. I shall pay —— cents."

"I'll buy a bunch of grapes. I'll pay —— cents."

"I want a pear. I shall pay —— cents."

"I wish an apple. I shall pay —— cents."

"I wish two oranges. I shall pay —— cents."

"I want 2 lemons. I shall pay —— cents."

"I want 2 peaches. I shall pay —— cents."

"I wish 3 plums. I shall pay —— cents."

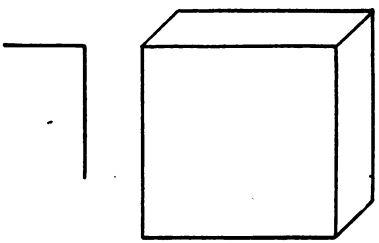
"I want 2 bananas. I shall pay —— cents."

"I want 2 bunches of grapes. I shall pay —— cents.

"I want 3 apples. I shall pay —— cents."

Now, children, you may make paper fruit to look as much like the real fruit as you can, and use it for fruit sales during the winter.

Exercise 21



A cube has —— faces.

Each face has —— corners. Each face has —— angles.

Count the corners on the cube.

Count the edges on the cube.

We have 6 one-inch cubes in a row.

Our row is —— inches long and —— —— wide and —— —— high.

We can see —— faces. How many faces of cubes are not seen?

When we take away four cubes, we have —— cubes left.

We again place them in two equal rows.

One-half of six cubes is —— cubes.

One-third of six cubes is —— cubes.

Two-thirds of six cubes are —— cubes.

Let the children make cubes of paper. Use pattern in Exercise 22.

Exercise 22

Fig I

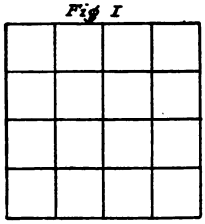


Fig II

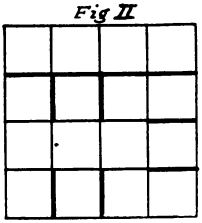
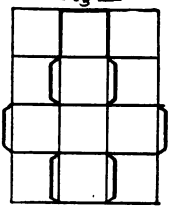


Fig III

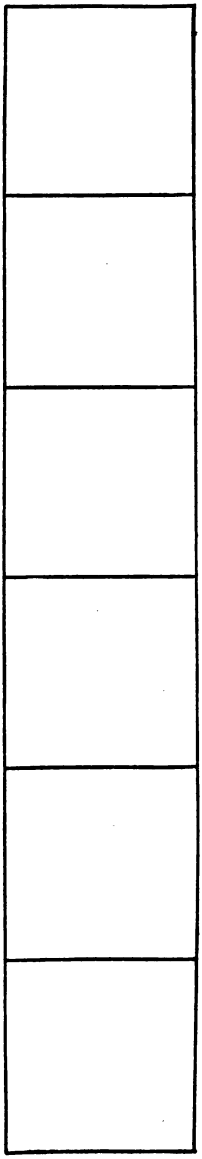


Take a four-inch square. Fold it the same as for the box.

Cut off one row of squares. Cut paper where heavy lines show in figure II.

Fold squares in shape of a cube, and paste the sides together.

A neater and more artistic plan is shown in figure III. If you use stiff paper, use this plan. Cut as figure III shows, and paste flaps in.



Exercise 23

We have —— inch squares in a row.

Move two inch squares below.

4 inch squares and —— inch squares are —— inch squares.

Move one inch square above.

1 inch square and —— inch squares are —— inch squares.

Move two inch squares below.

3 inch squares and —— inch squares are —— inch squares.

There are —— threes in 6.

There are —— twos in 6.

$\frac{1}{2}$ of 6 is 3. $\frac{2}{2}$ of 6 are 6.

$\frac{1}{3}$ of 6 is 2. $\frac{2}{3}$ of 6 are 4.

$$\begin{array}{ccc} 5 & 3 & 4 \\ 1 & 3 & 2 \\ \hline 6 & 6 & 6 \end{array}$$

Copy each addition fact five times.

Exercise 24

Copy each of the following problems three times:

1	2	3	2	3	4	4	5	3
1	1	1	2	2	1	2	1	3
2	3	4	4	5	5	6	6	6

Use a dozen objects and a foot rule.

6 is —— —— dozen.

6 inches is —— —— of a foot.

6 months is —— —— of a year.

There are —— working days in a week.

2 times 3 are 6. 3 times 2 are 6.

2 × 3 are 6. 3 × 2 are 6.

2 × 3 = 6. 3 × 2 = 6.

6 × 1 = ? 2 × 2 = ?

4 × 1 = ? 2 × 1 = ?

5 × 1 = ? 3 × 1 = ?

\+ means *times* or *multiplied by.*

= means *are* or sometimes *is.*

Count by fives to 100.

Count by tens to 100.

(1) Clyde has 6 apples. He gives each friend 2 apples till all are gone. He has —— friends.

(2) Charles gathered 4 quarts of cherries. Mary gathered 2 quarts. They both gathered —— quarts.

(3) Thomas bought 6 tablets and sold 5 of them. He now has —— tablet.

Exercise 25

Copy the following table three times:

$1 \times 1 = 1.$	1	One	I
$2 \times 1 = 2.$	2	Two	II
$3 \times 1 = 3.$	3	Three	III
$4 \times 1 = 4.$	4	Four	IV
$2 \times 2 = 4.$	5	Five	V
$5 \times 1 = 5.$	6	Six	VI
$2 \times 3 = 6.$			
$6 \times 1 = 6.$			

Count by 2's to 6. Count by 3's to 6.

2 cents and 3 cents are —— cents.

4 apples and 2 apples are —— apples.

3 dimes and 3 dimes are —— dimes.

5 oranges and 1 orange are —— oranges.

(1) If two boys divide 6 apples equally, each boy will take —— apples.

(2) One-half of 6 apples is —— apples.

(3) One-third of 6 apples is —— apples.

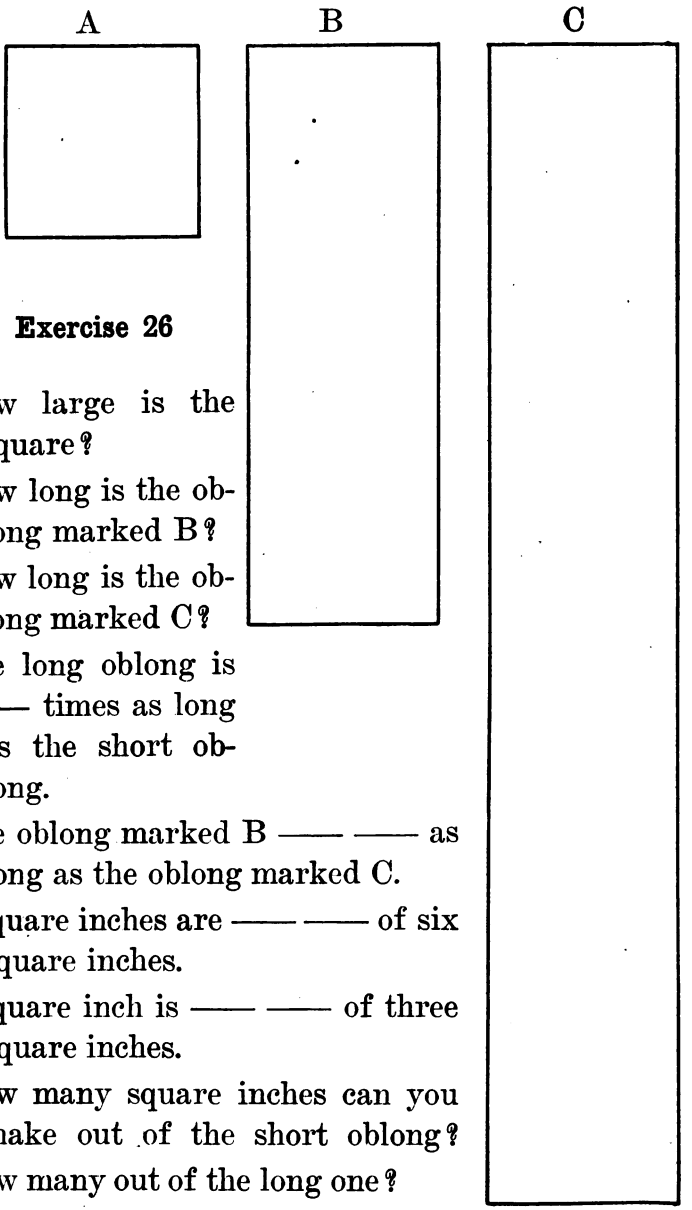
(4) Two-thirds of 6 apples are —— apples.

(5) Delmar can buy 3 two-cent stamps for —— cents.

(6) If one post card costs 3 cents, what will 2 post cards cost?

(7) One-half of a foot is —— inches. One-quarter of a foot is —— inches.

(8) 3 boys were drawing on the blackboard, and 3 were working problems. How many boys were at work?



Exercise 26

How large is the square?

How long is the oblong marked B?

How long is the oblong marked C?

The long oblong is —— times as long as the short oblong.

The oblong marked B —— —— as long as the oblong marked C.

3 square inches are —— —— of six square inches.

1 square inch is —— —— of three square inches.

How many square inches can you make out of the short oblong?

How many out of the long one?

Exercise 27

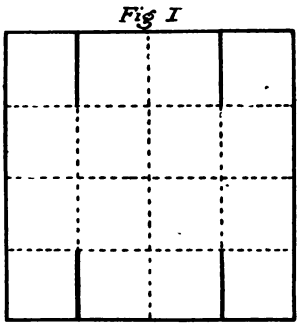
TEST

$2+3=?$	$4-2=?$	1	2
$4+1=?$	$2+2=?$	1	2
$6-4=?$	$3-3=?$	1	2
$3+3=?$	$5-1=?$	1	2
$6-3=?$	$4+3=?$	1	2
$4+2=?$	$6-2=?$	1	2
$3\times 2=?$	$4\times 1=?$	1	2
$2\times 2=?$	$3\times 1=?$	1	2
$5\times 1=?$	$1\times 5=?$	1	2

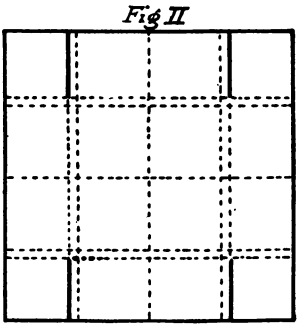
Change addition facts to two subtraction facts, as shown below.

2	4	4	2	5	5
+2	−2	−2	+3	−2	−3
4	6	6	3	4	4
+2	−4	−2	+1	−3	−1
5	6	6	4	5	5
+1	−5	−1	+1	−4	−1
2	3	3	3	6	6
+1	−2	−1	+3	−3	−3

Exercise 28



Box



Lid

Take a six-inch square of thick paper.

Lay the square even with your desk.

Fold the lower edge to the upper edge and press the fold. Unfold.

Fold the right edge to the left edge. Crease and unfold.

Fold the lower edge to the middle and crease. Fold the upper edge to the middle and crease. Unfold.

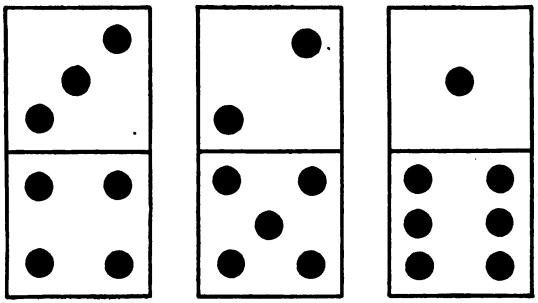
Fold the right edge to the middle and crease. Fold the left edge to the middle and crease. Unfold.

For the box, cut the dark lines as shown in figure I. Fold and paste.

For the lid do not make the last folds quite to the middle.

Cut the heavy lines as shown in figure II. Fold and paste.

Exercise 29



Make three dominoes of each kind.

Write:

cents six seven

There are —— days in a week.

There is —— four in 7 and —— over.

There are —— twos in 7 and —— over.

There are —— threes in 7 and —— over.

3	2	4	7	7	7	7	7
4	5	3	–5	–6	–0	–2	–1
7	7	7	2	1	7	5	6

Write pairs of 2, 3, 4, 5 and 6.

Count by tens, beginning with 1, 2, 3, 4, and 5.

Exercise 30

Cut 7 strips 7 inches long and 1 inch wide.

One strip contains —— square inches.

3 strips and 4 strips are —— strips.

2 strips and 5 strips are —— strips.

6 strips and 1 strip are —— strips.

Take a strip and fold it end to end. Cut it in two pieces.

One-half of 7 inches is —— —— inches.

Take another strip and see how many two-inch strips you can make. What have you left?

Take another strip and see how many three-inch strips you can make. What have you left?

Copy the following five times:

3	5	6	7	7	7	7
4	2	1	−4	−5	−6	−3
7	7	7	3	2	1	4
7	7	6	6	6	6	5
−2	−1	−6	−1	−4	−3	−2
5	6	0	5	2	3	3

Write these words:

inches strip pieces

Exercise 31

Use ruler to measure after drawing.

Draw a line seven inches long.

Draw a line one-half of 7 inches. How long is it?

Draw a line a foot long. What is one-half of this line?

How many inches in a foot?

How much longer is your 7-inch line than your 6-inch line?

3 rulers laid end to end make a ——.

Draw a 3-foot line. Give this line another name.

What do we measure by the yard?

What do we measure by the foot?

Write numbers from 1 to 50.

Write numbers from 2 to 50 by twos.

3 inches and —— inches are 7 inches.

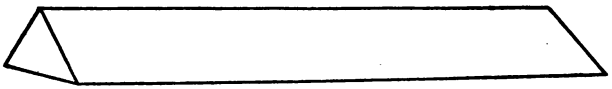
5 inches and —— inches are 7 inches.

6 inches and —— inch are 7 inches.

4 inches and —— inches are 6 inches.

2 inches and —— inches are 5 inches.

Exercise 32



Prism

A prism has —— ends and —— sides. The ends are ——.

If we put our prism in the sunlight, we see the colors of the rainbow.

The prism shows 7 colors.

The 7 colors are violet, indigo, blue, green, yellow orange and red.

I have seen —— —— —— —— —— colors on plants.

I have seen —— —— —— —— —— colors on birds.

I have seen —— —— —— —— —— colored dresses.

I have seen —— —— —— —— —— colored houses.

Exercise 33

(1) 7 boys were playing hide and seek. 3 boys were found. How many were not found?

(2) 5 girls were playing with dolls. Each girl had one doll. Jennie came and brought 2 more dolls. How many dolls have they now?

Count by tens, beginning with seven.

(3) Mary has 7 yards of lawn for 2 doll dresses. Each dress will require —— yards.

(4) 7 birds were on the fence. 2 birds flew away. How many are on the fence?

(5) 7 girls belonged in the reading class. 1 girl was absent. How many girls were present?

(6) A boy had 7 marbles in his pocket but lost 6. How many had he left?

Copy each pair of numbers that make 7, five times.

Exercise 34

(1) In a week James spends 5 days in school and —— days at home. Name the days he spends at school. Name the days he spends at home.

(2) If John had 5 arrows and made 2 more, he would then have —— arrows.

(3) Ruth had 7 apples and gave 1 apple to each of 3 boys. She then had —— apples.

(4) Helen drew 7 pictures and lost 4 of them. She had —— pictures left.

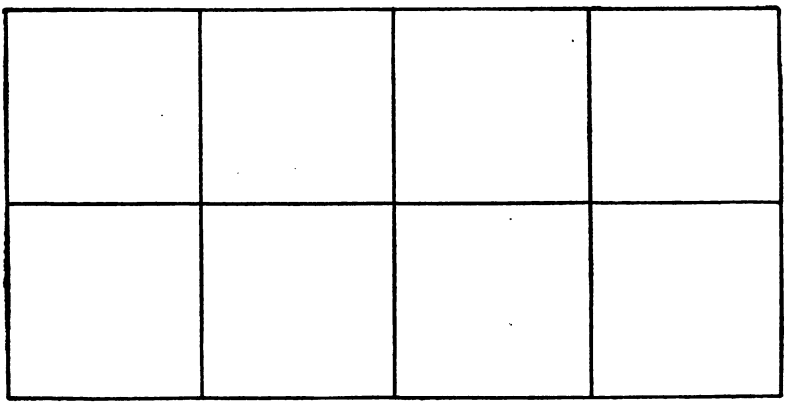
Count by tens to 103, beginning with 3.

Copy the following:

3	5	6	3	4	4	2
4	2	1	3	2	1	2
7	7	7	6	6	5	4

The first day of the week is ——.
The seventh day of the week is ——.
Name the days of the week. Name 7 games.

Exercise 35



This oblong is —— inches wide and —— inches long.

The two ends are —— inches. The two sides are —— inches.

If we move our pencil around this oblong it will travel —— inches.

4 square inches and 4 square inches are —— square inches.

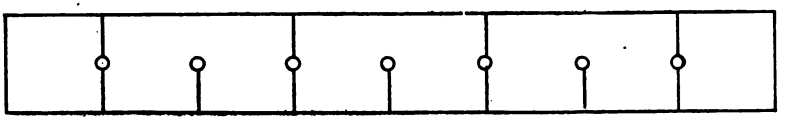
One-half of 8 square inches is —— square inches.

One-fourth of 8 square inches is —— square inches.

Write:

books pencils eight

Exercise 36



You have made circles with patterns.

We can make circles of any size we wish with a circle-maker. I shall tell you how.

Cut a strip of thin pasteboard 6½ inches long and one-half inch wide. Measure the inches and half inches. Mark the inches by lines across the strip.

Mark the half inches by lines half across the strip. Punch a hole in each line in the center of the strip.

Place a pin in one hole, sticking it through your paper. Place your pencil point in another hole, the distance away from the pin being half the size of the circle you wish to make. Whirl your circle-maker, and you will have a perfect circle.

Exercise 37

Cut an oblong 8 inches long and 4 inches wide.

Lay it even with the edge of the desk.

Fold the lower edge to the upper edge.

How wide is your oblong?

Open and fold right edge to left edge.

How many oblongs?

Open and fold right edge to the middle.

Fold left edge to the middle.

How many squares have you now?

Draw a circle in each square.

How many circles have you?

How wide is your circle?

8 circles less 4 circles are —— circles.

8 circles less 3 circles are —— circles.

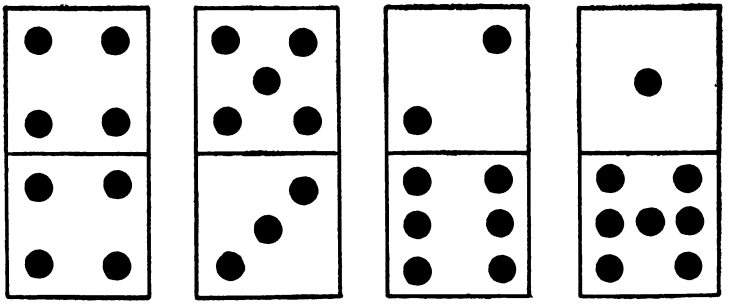
8 circles less 6 circles are —— circles.

8 circles less 7 circles is —— circle.

8 circles less 5 circles are —— circles.

Count by 4's to 100.

Exercise 38



Make 3 of each domino.

2 pints make 1 quart.

4 quarts are —— pints.

4 gills make one pint.

2 pints are —— gills.

8 gills are —— pints.

8 pints are —— quarts.

$4+4=?$

$5+3=?$

$2+6=?$

$1+7=?$

$3+4=?$

$4+2=?$

$5+2=?$

4 pints and 4 pints are —— quarts.

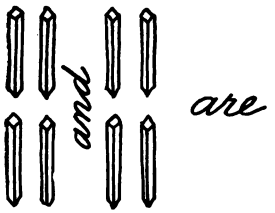
5 pints and 3 pints are —— pints.

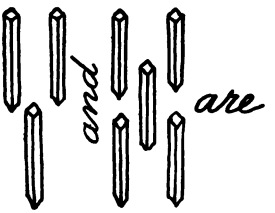
2 gills and 6 gills are —— pints.

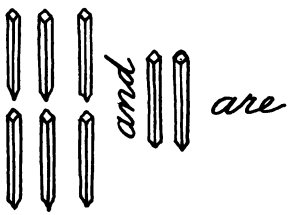
1 quart and 7 quarts are —— quarts.

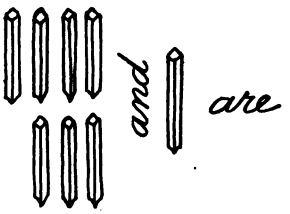
2 pints and 6 pints are —— quarts.

Exercise 39









$6+2=$ ——.
$5+2=$ ——.
$4+2=$ ——.

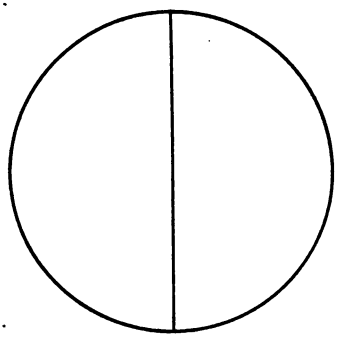
$7+1=$ ——.
$5+3=$ ——.
$4+4=$ ——.

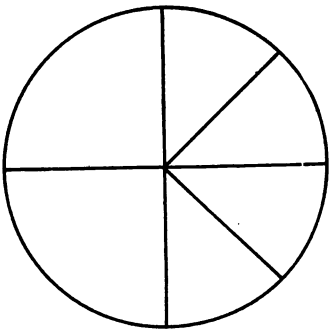
8 less 2 are ——.
8 less 4 are ——.
8 less 5 are ——.
8 less 1 are ——.

8 less 6 are ——.
8 less 4 are ——.
8 less 3 are ——.
8 less 7 is ——.

There are —— twos in 8.
There are —— fours in 8.
There are —— threes in 8 and —— over.
5 sticks and 2 sticks are —— sticks.
4 sticks and 4 sticks are —— sticks.

Exercise 40





We have cut an 8-inch square.

We have cut an 8-inch circle from the square.

We may call the circle a pie.

We cut the pie into two equal parts.

One part is called —— ——.

We now cut the pie into four equal parts.

We call each part a quarter or —— ——.

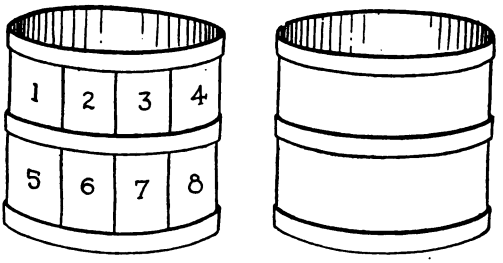
Now let us cut one pie into eight equal parts.

Each part is called one ——.

If we take away 4 parts we have —— parts left.
Place the parts together again.

If we take away 3 parts we have —— parts left.

Exercise 41



A Peck A Peck

8 quarts make a peck.

4 quarts make —— —— peck.

1 peck makes —— quarts.

One-half peck makes —— quarts.

6 quarts and 2 quarts are —— quarts or —— peck.

3 quarts and 5 quarts are —— quarts or —— peck.

4 quarts and 4 quarts are —— peck.

7 quarts and 1 quart are —— quarts

One-fourth of a peck is —— quarts.

—— pecks make a bushel.

8 pecks make —— bushels.

2×4 pecks make —— bushels.

$5 + 3$ pecks make —— bushels.

Exercise 42

(1) If 2 quarts of milk cost 1 dime, how much milk will a nickel buy?

(2) Delmar had 8 chickens and he sold 2 of them. He now has —— chickens.

(3) Charles has 6 books and he buys 2 more. He then has —— books.

(4) Genevieve had 8 apples and she gave 5 of them to her playmates. She has —— apples left.

(5) If one pencil costs 2 cents, 4 pencils will cost —— cents.

(6) I have 8 pieces of crayon. I wish to give 2 pieces to each pupil. To how many pupils will I give crayons?

(7) In 8 pints there are —— quarts. In 8 gills there are —— pints.

Exercise 43

$1 \times 1 = 1.$
$2 \times 1 = 2.$
$3 \times 1 = 3.$
$4 \times 1 = 4.$
$2 \times 2 = 4.$
$5 \times 1 = 5.$

$6 \times 1 = 6.$
$2 \times 3 = 6.$
$7 \times 1 = 7.$
$8 \times 1 = 8.$
$2 \times 4 = 8.$
$4 \times 2 = 8.$

8 less 4 are 4.
$8 - 3 = 5.$
$8 - 2 = 6.$

8 less 3 are ——.
$8 - 5 =$ ——.
$8 - 6 =$ ——.

Change each of the addition problems to two subtraction problems, as:

4	8	8	5	8	8
+4	−4	−4	+3	−5	−3
6	8	8	7	8	8
+2	−6	−2	+1	−7	−1

Copy each of the above problems 5 times.

Count by 5's to 100. Count by 3's to 100.

Exercise 44

Count by 10's to 100, beginning with 0, 1, 6, 5, 3, and 4.

Take the combination "6 and 2" to 100, as shown below.

Take the combination "5 and 3" to 100, as shown below.

6 + 2 = 8.	5 + 3 = 8.
16 + 2 = 18.	15 + 3 = 18.
26 + 2 = 28.	25 + 3 = 28.
36 + 2 = 38.	35 + 3 = 38.
46 + 2 = 48.	45 + 3 = 48.
56 + 2 = 58.	55 + 3 = 58.
66 + 2 = 68.	65 + 3 = 68.
76 + 2 = 78.	75 + 3 = 78.
86 + 2 = 88.	85 + 3 = 88.
96 + 2 = 98.	95 + 3 = 98.

Take these combinations to 100.

$3+4=7.$ $5+2=7.$ $4+4=8.$

Write: 7, seven, VII. 8, eight, VIII.

Exercise 45

How many feet have 2 horses?
How many feet have 4 chickens?
How many ears have 4 horses?
How many eyes have 2 people?
How many hands have 4 persons?
How many bills have 8 birds?
3 birds have —— feet.
2 chickens have —— feet.
2 horses have —— feet.
4 cows have —— horns.
How many fingers have you?
Count from eight backwards.
Name 8 kinds of trees.

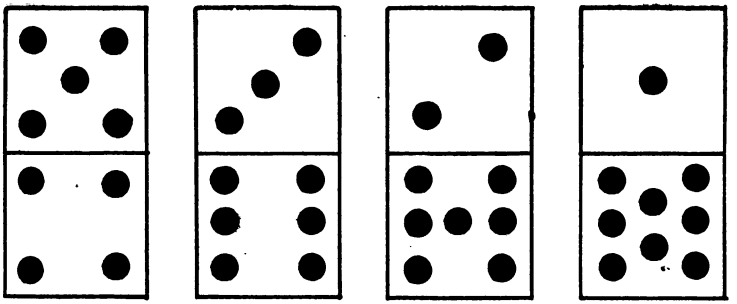
$2\times2=?$
$3\times1=?$
$4\times2=?$
$6\times1=?$
$5\times1=?$
$3\times2=?$
$2\times4=?$
$1\times7=?$
$3+3=?$
$2+5=?$
$4+3=?$
$2+2=?$
$3+2=?$
$6+1=?$

Copy:

2 times 4 are 8.	$4+4=8.$	$8-4=?$
4 times 2 are 8.	$5+3=8.$	$8-5=?$
8 times 1 are 8.	$6+2=8.$	$8-6=?$
1 times 8 are 8.	$7+1=8.$	$8-7=?$

Memorize the tables given above.

Exercise 46



Make dominoes like these.

5 cents and 4 cents are —— cents.

6 books and 3 books are —— books.

2 cats and 4 cats are —— cats.

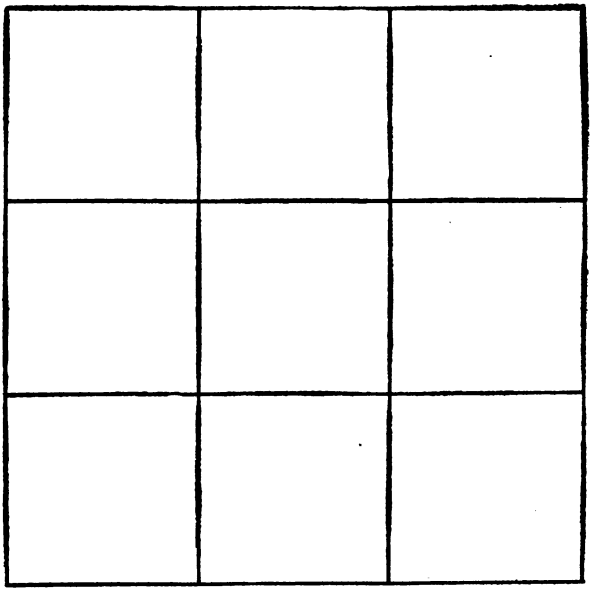
2 dots and 7 dots are —— dots.

8 pencils and 1 pencil are —— pencils.

Copy three times:

4	9	9	3	9	9
+5	−4	−5	+6	−3	−6
9	5	4	9	6	3
8	9	9	7	9	9
+1	−8	−1	+2	−7	−2
9	1	8	9	2	7

Exercise 47



Let the children make above square, using inch squares.

This is a —— inch square.

Each side is —— inches long.

Our pencil must move —— inches in going around this square.

There are —— square inches in this square.

3 times 3 square inches are —— square inches. $3 \times 3 = ?$

There are —— threes in 9. One-third of 9 is ——.

Two-thirds of 9 are ——. Three-thirds of 9 are ——.

Exercise 48

I have nine squares in a row.

My row is —— inches long and —— inch wide.

I put them in three rows.

Now I have a —— —— square.

Each row is —— inches long.

One-third of 9 square inches is —— square inches.

Copy and write the answer to each:

3 threes are ——.	$3 \times 3 = ?$
3 times 3 are ——.	$9 \times 1 = ?$
$\frac{1}{3}$ of 9 is ——.	$2 \times 4 = ?$
$\frac{2}{3}$ of 9 are ——.	$3 \times 2 = ?$
$\frac{3}{3}$ of 9 are ——.	$2 \times 2 = ?$

Draw a line 9 inches long.

Divide it into thirds.

Each third is —— inches long.

Draw another line 9 inches long.

Divide it into halves.

Each half is —— inches long.

Measure and see if you are right.

4	6	7
+5	+3	+2
8	3	8
+1	+3	−4
9	9	9
−4	−3	−2

Exercise 49

Build a 3-inch cube.

A 3-inch cube contains —— inch cubes.

Each face has —— square inches.

Each edge is —— inches.

Each face has —— corners.

Let us call each square inch one square foot.

3 × 3 square feet are —— square feet.

9 square feet are —— square yard.

Show by drawing on the blackboard.

2 × 3 feet are —— yards.

1 square foot is —— —— of a square yard.

3 square feet are —— —— of a square yard.

Lay rulers to show a square yard.

A square yard contains —— square feet.

One-third of a square yard is —— square feet.

Two-thirds of a square yard are —— square feet.

Three-thirds of a square yard are —— square feet.

Write numbers as far as you can.

Exercise 50

(1) Gillette has 4 marbles and James has 5. They both have —— marbles.

(2) Elizabeth had 3 dolls and her playmates brought 6 more. They then had —— dolls.

(3) If 3 pencils cost 9 cents, one pencil costs —— cents.

(4) If one yard of ribbon costs 3 cents, 3 yards will cost —— cents.

(5) Mary has 9 pears and she gives 1 pear to each of 6 girls. She has —— pears left.

(6) 9 boys form a solid square. There are —— boys in each row.

(7) 4 girls sit in each of 2 rows of seats. One sits in the third row. How many girls in the class?

(8) There are 7 boys at the blackboard and 2 boys in their seats. How many boys in class?

Exercise 51

Use the circle-maker.

Make 9 circles the size of a dollar.

Make 9 circles the size of a half dollar.

Make 9 circles the size of a quarter.

Measure the pieces of money and find the width of each piece.

If the dollar is one and one-half inches wide, place your pencil three-quarters of an inch from the pin.

Make nine circles, color them and place them on a cardboard. (Let the children choose the size.)

5 circles and 4 circles are ——.

3 circles and 6 circles are ——.

$$\begin{array}{rr} 4 & 3 \\ 5 & 6 \\ \hline \end{array}$$

2 circles and 7 circles are ——.

9 circles less 3 circles are ——.

$$\begin{array}{rr} 2 & 8 \\ 7 & 1 \\ \hline \end{array}$$

9 circles less 5 circles are ——.

9 circles less 2 circles are ——.

$$\begin{array}{rr} 9 & 9 \\ -3 & -5 \\ \hline \end{array}$$

1 nickel is —— cents.

1 dime is —— cents.

1 dime is —— nickels.

2 dimes are —— cents.

1 pint is —— gills.

1 quart is —— pints.

1 gallon is —— quarts.

1 peck is —— quarts.

1 bushel is —— pecks.

Save your circle-maker for future use.

Exercise 52

2 nickels are — cents.
2 pints are — gills.
2 quarts are — pints.
2 gallons are — quarts.
2 bushels are — pecks.
4 quarts are — pints.
4 pints are — quarts.
2 gills are — pint.
8 pints are — quarts.
3 feet are — yard.
9 feet are — yards.

Copy the above and put the answer in each blank.

6 inches are — foot.
6 months are — year.
6 things are — dozen.
1 dollar is — dimes.
1 dime is — cents.
1 dollar is — cents.
One half nickel is — cents.
One half dime is — cents.
One half pint is — gills.
One half quart is — pint.
One half gallon is — quarts.
One half peck is — quarts.

Copy the above and put the answer in each blank.

Exercise 53

REVIEW

2	6	7	3	4	5	6	8
+3	+1	+2	+3	+4	+4	+3	+1
9	9	6	7	8	8	9	9
−3	−7	−3	−2	−5	−6	−2	−8
4	3	6	3	5	2	1	2
×2	×3	×1	×2	×1	×2	×6	×4

$\frac{1}{2}$ of 4 is ? $\frac{1}{2}$ of 6 = ? $\frac{1}{2}$ of 8 = ?

$\frac{1}{3}$ of 6 is ? $\frac{1}{3}$ of 9 = ? $\frac{1}{4}$ of 8 = ?

Copy the above and place answers. Commit to memory.

Count by twos to 50, beginning with zero.

Count by threes to 50, beginning at zero.

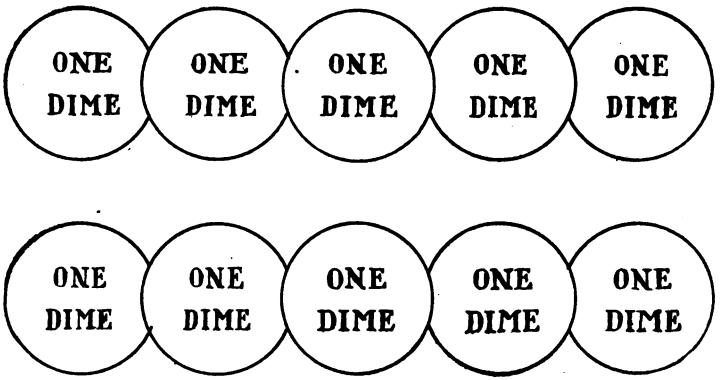
Count by twos to 50, beginning with 1.

Count backwards by twos, beginning with 51.

Exercise 54

1 one I
2 two II
3 three III
4 four IV
5 five V
6 six VI
7 seven VII
8 eight VIII
9 nine IX
10 ten X

Exercise 55



10 dimes make a dollar.

1 dollar is —— dimes.

One-half dollar is —— dimes.

5 dimes and 5 dimes are —— dimes.

6 dimes and 4 dimes are —— dimes.

7 dimes and 3 dimes are —— dimes.

8 dimes and 2 dimes are —— dimes.

One-half of 10 dimes is —— dimes.

One-fifth of 10 dimes is —— dimes.

Two-fifths of 10 dimes are —— dimes.

Three-fifths of 10 dimes are —— dimes.

Four-fifths of 10 dimes are —— dimes.

Let children make paper dimes for buying and selling.

Exercise 56

We often write square inches,—sq. in.

I have 10 inch squares in a row.

My row is —— —— long and —— —— wide.

I place my inch squares in two equal rows.

I have an oblong —— —— long and —— —— wide.

5 inch squares and —— inch squares are —— inch squares.

Take one of the squares from the lower row and place it in the upper row.

6 sq. in and —— sq. in. are 10 sq. in.

Place another square above.

7 sq. in. and —— sq. in. are —— sq. in.

Place another square above.

8 sq. in. and 2 sq. in. are —— sq. in.

Place another square inch above.

9 sq. in. and 1 sq. in. are —— sq. in.

There are —— pairs of numbers that make ten.

NOTE:—Let the teacher place these pairs of ten on the board as the children show them with the squares.

Exercise 57

1 ten is 10.
2 tens are 20.
3 tens are ——.
4 tens are ——.
5 tens are ——.
6 tens are ——.
7 tens are ——.
8 tens are ——.
9 tens are ——.
10 tens are ——.

$8 + 2 = ?$
$6 + 4 = ?$
$2 \times 5 = ?$

Count by 10, beginning with 1; with 2; with 4.

1	2
11	12
21	22
31	32
41	42
51	52
61	62
71	72
81	82
91	92
101	102

Count by 10's from 0 to 100 and backwards.
Count by 10's from 3 to 100 and backwards.

Exercise 58

The pairs of ten are:

5	4	3	8	9
5	6	7	2	1
10	10	10	10	10

Take your inch squares and show each pair.

5 cents and 5 cents are —— cents.
4 books and 6 books are —— books.

3 dogs and 7 dogs are —— dogs.
8 birds and 2 birds are —— birds.
9 horses and 1 horse are —— horses.
2 stars have —— points.
2 nickels are —— cents.
2 hands have —— fingers and thumbs.
2 weeks have —— school days.
10 dimes make —— dollar.
5 birds have —— wings.
5 persons have —— eyes.
5 chickens have —— feet.

Copy the pairs of 10 five times.

Exercise 59

Count by 10's to 100, beginning with 0.
Count by 10's to 100, beginning with 5.
Count by 10's to 100, beginning with 6.
Count backwards by 10's from 100 to 0.
Count backwards by 10's from 109 to 9.
Count backwards by 10's from 105 to 5.

(1) Eggs are 10 cents a dozen. 5 cents will buy —— —— dozen.

(2) Milk is 10 cents a half gallon. 5 cents will buy a —— of milk.

(3) At 20 cents a gallon, 1 dime will buy —— —— gallon.

(4) If I buy ten yards of ribbon for 1 dollar, one yard costs ——.

(5) At 10 cents a yard, 5 yards will cost —— cents.

(6) At 10 cents apiece, 1 dollar will buy —— pencils.

Write the numbers to 50.

Exercise 60

I have 5 pennies and a 5-cent piece.

When I count my money I find I have —— cents, or —— dime.

10 cents are —— dime.

5 cents are —— —— of a dime.

2 cents are —— —— of a dime.

2 × 5 cents are —— cents, or —— dime.

One-half of a nickel is —— and —— —— cents.

One-half of a dime is —— cents.

One-fifth of a dime is —— cents.

We can buy —— with a nickel.

We can buy —— with a dime.

We can buy 2 —— with a dime.

We can buy 10 —— with a dime.

We can buy 5 —— with a dime.

Count by 5's and 10's to 100.

Write the numbers to 75.

Exercise 61

Change each of the following addition facts to two subtraction facts, as:

5	10	10	6	10	10
+5	−5	−5	+4	−6	−4
10	5	5	10	4	6
7	10	10	8	10	10
+3	−7	−3	+2	−8	−2
10	3	7	10	2	8
9	10	10			
+1	−9	−1			
10	1	9			

$5 + 5 = ?$
$8 + 2 = ?$
$7 + 3 = ?$
$6 + 4 = ?$
$9 + 1 = ?$

$7 + 3 = 10.$
$17 + 3 = 20.$
$27 + 3 = 30.$
$37 + 3 = 40.$
$47 + 3 = 50.$
$57 + 3 = 60.$
$67 + 3 = 70.$
$77 + 3 = 80.$
$87 + 3 = 90.$
$97 + 3 = 100.$

Count by 5's, 4's and 3's to 100.

Exercise 62

A DINNER PARTY

Use your circle-maker and make some paper plates.

Measure your dinner plates at home.

Make your plates the size of them if your circle-maker is long enough.

Measure your pie plates and make one.

Measure your saucers and make one.

If you wish, make a cup.

Measure your sauce dishes and make one.

Now, set your table.

How many people will you have at your table?

How many on a side? On the end?

How many on two sides? On two ends?

Name 4 kinds of meat; 2 kinds of bread.

Name 4 kinds of fruit; 4 kinds of pies.

Name 2 kinds of pickles.

What will you have for dessert?

How many spoons will you need at each place?

How many spoons for all?

How many knives and forks for all?

Exercise 63

(1) If 1 yard of ribbon costs 2 cents, 5 yards will cost —— cents.

(2) I have a dime. I buy 5 pencils with it. What do I pay for each pencil?

(3) If 1 quart of milk costs 5 cents, one-half gallon costs —— cents.

(4) In going to school I rode 8 blocks on the car and walked 2 blocks. How far is my home from school?

(5) I buy 8 cents worth of drawing paper. I hand the merchant I dime. How much change will he give me?

(6) I buy 2 yards of ribbon at 4 cents a yard. I hand the saleslady a dime. She gives me —— cents in change.

(7) If I buy 2 pencils at 5 cents apiece, how much change will I get from a dime?

(8) At 10 cents a yard, how many yards can I buy for 1 dollar?

Exercise 64

1 dollar	= ?	1 pint	= ?
1 dime	= ?	1 peck	= ?
1 nickel	= ?	1 bushel	= ?
1 quart	= ?	1 yard	= ?
1 gallon	= ?	1 foot	= ?

2 dollars are —— dimes.	$2 \times 2 = ?$
2 dimes are —— cents.	$2 \times 3 = ?$
4 nickels are —— cents.	$5 \times 1 = ?$
2 quarts are —— pints.	$3 \times 3 = ?$
2 gallons are —— quarts.	$2 \times 5 = ?$
2 pints are —— gills.	$4 \times 2 = ?$
2 bushels are —— pecks.	$6 \times 1 = ?$
3 yards are —— feet.	$7 \times 1 = ?$

One-half peck is —— quarts.	2	5	2
One-half foot is —— inches.	5	1	3
One-half gallon is —— quarts.	6	3	4
One-half gallon is —— pints.	8	1	5
One-half dollar is —— cents.	2	2	6
	1	1	2
	3	4	1

Copy this page with correct answers.

Exercise 65

"A pint is a pound the world around," they say.
A pint fills 2 teacups. 1 teacupful is—— —— pound.

(1) We have 6 windows and 2 doors in our room. We have —— more windows than doors.

(2) I bought a peck of cherries and sold 4 quarts. I have —— quarts left.

(3) I bought a gallon of milk and gave 2 quarts to my friend. I had —— quarts to use.

(4) The milkman brought us 10 quarts of milk. We had —— gallons and —— quarts.

(5) I ordered 2 gallons of vinegar. How many quart jars will it fill?

(6) Sugar is 5 cents a pound. How many pounds can I get for a dime?

(7) We shall use 3 pounds of sugar for our candy. How many teacupfuls shall we use?

Write the pairs of 10, 9, 8, 7.

Exercise 66

DRILL

1	3	6	4	7	5	2	8
			+2				
6	3	1	5	2	4	7	8
			+3				
10	8	5	7	9	6	4	3
			−3				

8	10	6	9	7	5	3	4
			−2				

10	8	6	9	7	5	4
			−4			

Write the pairs of the numbers:

9, 10, 8, 7, 5, 4, 3, 6.

Count by fives, beginning with 0.

Exercise 67

Pint may be written, pt.
Quart may be written, qt.
Peck may be written, pk.
Bushel may be written, bu.

2 times 4 pints are —— qt.
3 times 3 pints are —— qt. and —— —— over.
2 times 5 quarts are —— pk. and —— —— over.
4 times 2 gills are —— pt.
10 quarts are —— pints.
10 gills are —— pints and —— ——.
10 quarts are —— gallons and —— ——.
10 pints are —— quarts.
9 pints are —— quarts and —— —— over.
7 pints are —— quarts and —— —— over.
6 pints are —— quarts.
5 quarts are —— gallon and —— —— over.
6 quarts are —— gallon and —— —— over.

Copy this exercise and fill blanks.

Exercise 68

TEST

$1 \times 1 =$	$2 + 2 =$	$3 + 4 =$
$2 \times 1 =$	$1 + 9 =$	$7 + 1 =$
$3 \times 1 =$	$7 + 3 =$	$8 - 2 =$
$2 \times 2 =$	$8 + 2 =$	$9 + 1 =$
$4 \times 1 =$	$9 - 3 =$	$8 - 3 =$
$5 \times 1 =$	$5 - 4 =$	$5 - 3 =$
$2 \times 3 =$	$6 - 4 =$	$7 - 4 =$
$6 \times 1 =$	$7 + 2 =$	$8 - 3 =$
$7 \times 1 =$	$8 + 1 =$	$9 - 5 =$
$8 \times 1 =$	$9 - 8 =$	$5 - 3 =$
$4 \times 2 =$	$5 + 5 =$	$6 - 4 =$
$9 \times 1 =$	$10 - 5 =$	$9 - 7 =$
$3 \times 3 =$	$6 + 4 =$	$10 - 8 =$
$2 \times 5 =$	$8 - 8 =$	$9 - 2 =$
$10 \times 1 =$	$10 - 9 =$	$10 - 8 =$
$5 \times 2 =$	$10 - 6 =$	$9 - 9 =$

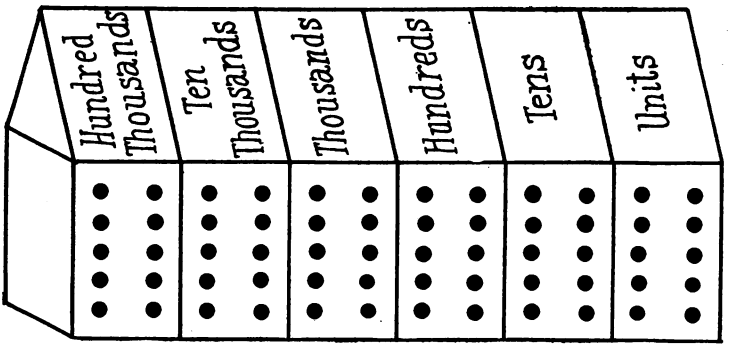
Copy and recite the above facts.

PART TWO

TO THE TEACHER

Review the number facts studied in Part One. If necessary, continue to use objects to develop these facts. Developing, reviewing and drilling will produce the desired result. Seeing, imaging, thinking and memorizing constitute the process of number learning.

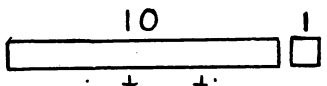
Exercise 1



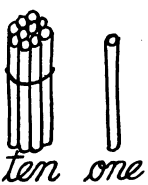
10 units make one ten. 1 0

10 tens make one hundred. 1 0 0

We can tell whether a figure stands for units or for tens by the place it occupies.



10 is ten times 1.



11 is made of
1 ten and 1.

11 is 11 times 1.

10
+1
11

1 10
1 10
1 10
1 10
1 10
1 10
1 10
1 10
1 10
1 10
10 100

10 cents make a dime. 10 dimes make a dollar.

11 cents make a dime and 1 cent.

Exercise 2

Use inch squares for the work that follows:

I have 11 inch squares in a row.

My row is —— inches long and —— inch wide.

I move 2 inch squares below. I find that 2 inch squares and —— inch squares are 11 inch squares.

I move 4 inch squares below. I find that 6 inch squares and —— inch squares are 11 inch squares.

I place 3 inch squares back in the upper row. I now find that 8 inch squares and —— inch squares are 11 inch squares.

I move 1 more inch square below. Now what numbers do I find make 11?

(Let the teacher copy these pairs of numbers on the board as the children work them out with squares.)

Exercise 3

The pairs of numbers that make 11 are:

5	9	7	8	10
6	2	4	3	1
11	11	11	11	11

Copy the above combinations five times.

6 pears and 5 pears are —— pears.

7 pecks and 2 pecks are —— pecks.

8 apples and —— apples are 11 apples.

1 box and —— boxes are 11 boxes.
3 dogs and 8 dogs are —— dogs.
5 pigs and —— pigs are 11 pigs.
4 girls and —— girls are 11 girls.
11 boys less 4 boys are —— boys.
11 books less 8 books are —— books.
11 knives less 3 knives are —— knives.

Write:

nine ten eleven

Exercise 4

If necessary, use drawings on the blackboard to work out the following problems:

In 11 pecks there are —— bushels.
In 11 pints there are —— quarts.
In 11 quarts there are —— gallons.
In 11 gills there are —— pints.
In 11 feet there are —— yards.
11 things are —— things and —— things.
11 boxes are —— boxes and —— boxes.
11 books are —— books and —— books.
11 houses are 4 houses and —— houses.

(1) There are 3 houses on one street and 8 houses on another. On both streets there are —— houses.

Exercise 5

Let each child use inch squares and work out the five pairs of numbers that make 11. White the addition combinations that make the number 11 and change each combination to two subtraction problems, as follows:

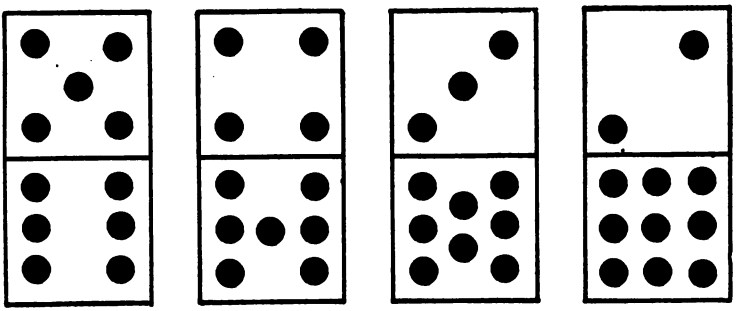
5	11	11	7	11	11
+6	−5	−6	+4	−4	−7
11	6	5	11	7	4
8	11	11	9	11	11
+3	−8	−3	+2	−9	−2
11	3	8	11	2	9
10	11	11	10	11	10
+1	−10	−1	−4	−7	−8
11	1	10	6	4	2

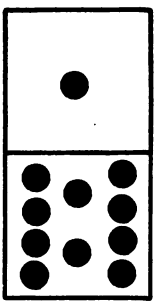
(1) A boy had 10 rabbits, but 4 ran away. He had —— left.

(2) Edith had 3 dolls and her aunt gave her 4 more. She then had —— dolls.

(3 Dorothy had 6 little cups and broke 4. She bought 2 more. How many had she then?

Exercise 6





Let the children make 3 dominoes of each kind.

Write pairs of 11 in figures from dots on dominoes.

Change each addition problem to two subtraction problems.

Let children keep these dominoes to use in their game of buying and selling.

Exercise 7

(1) There are 7 birds on the grass and 4 birds on the porch. In both places there are —— birds.

(2) I bought 9 cents worth of paper and a two-cent postage stamp. How much did I spend?

(3) I paid 5 cents for colored crayons, 3 cents for pencils and 3 cents for paper. How much did I spend?

(4) My father gave me 11 cents and I paid a dime for two pencils. How many cents have I now?

(5) Henry had 11 cents. He bought a pencil for 5 cents; a post card for 3 cents. How much has he now?

(6) A farmer has 11 horseshoes. He can shoe —— horses and have —— shoes left.

(7) A lady has 11 gloves. She has —— pairs of gloves and —— glove.

Exercise 8

Use toy money to work out these problems. Let children make paper circles the size of the different pieces of money used.

In 11 cents there are —— nickels and —— cent.
In 11 cents there are —— dime and —— cent.
In 11 cents there are —— 3-cent pieces and —— cents.
In 10 cents there are —— nickels.
In 1 dollar there are —— dimes.
In 1 dime there are —— cents.
In 2 dimes there are —— cents.
In 3 dimes there are —— cents.
In 2 dimes there are —— nickels.
In 5 dimes there are —— nickels.
In 2 dollars there are —— dimes.
In 5 dollars there are —— dimes.
In one-half dollar there are —— nickels.
In 15 cents there are —— dime and —— nickel.

Exercise 9

11 is ? more than 3.
11 is ? more than 9.
11 is ? more than 4.
11 is ? more than 5.
11 is ? more than 6.
11 is ? more than 2.
11 is ? more than 7.
11 is ? more than 8.

There are 2 fives and ? in 11.
There are 3 threes and ? in 11.
There are 2 fours and ? in 11.
There are 3 twos and ? in 11.

10 is 1 less than ?
9 is 2 less than ?
7 is 4 less than ?
6 is 5 less than ?
4 is 2 less than ?
8 is 3 less than ?

3	8	5	6	5	6	5	3	5	3	4
3	2	3	4	6	2	5	4	4	6	7

Exercise 10

Copy and solve the problems given below. Use them for rapid oral work during the recitation.

6	7	3	5	8	6	9
+3	+2	+3	+1	+3	+1	−1
9	9	6	6	11	7	10
−3	−7	−3	−5	−8	−6	−9
3	6	4	2	3	2	$5\frac{1}{2}$
×2	×1	×2	×2	×3	×5	×2

3	7	2	6	2	1
2	1	5	1	3	2
1	6	1	7	2	1
2	2	8	2	3	2
3	4	1	1	2	1
4	1	3	3	3	2

In what month does Thanksgiving come?

Name 11 things for which we should be thankful.

Exercise 11

(1) I have a dime and 1 cent.

(2) I have —— cents.

(3) I can buy —— with 11 cents.

(4) I can buy —— with 11 cents and have —— cent left.

(5) I can buy —— with 11 cents and have —— cents left.

(6) I can buy 3 —— with 11 cents and have —— cents left.

(7) 5 apples at 2 cents apiece cost ——.

(8) 3 oranges at 2 cents apiece cost —— cents. If I give the clerk 10 cents, I'll get —— cents in change.

(9) If I buy 4 cards at $2\frac{1}{2}$ cents apiece, how many cents must I give the salesman?

(10) With 11 cents I can buy a 5-cent tablet and have —— cents left.

Exercise 12

In five and one-half inches there are —— half inches.

One-half foot and —— inches are 11 inches.

One-half dozen and 2 eggs are —— eggs.

11 half inches are —— inches.

8 half inches are —— inches.

10 half inches are —— inches.

9 half inches are —— inches.

7 half inches are —— inches.

6 half inches are —— inches.

11 pints are —— quarts and —— pint.

11 quarts are —— peck and —— quarts.

Exercise 13

11 less 2 times 3 are ——.

11 less 7 times 1 are ——.

11 less 2 times 4 are ——.

11 is 5 times 2 and ——.

11 is 4 times 1 and ——.

11 is 6 times 1 and ——.

11 is 2 times 3 and ——.

11 is 3 times 3 and ——.

11	11
−4	−6
11	11
−5	−3
11	11
−8	−2

$8+3=11.$
$18+3=21.$
$28+3=31.$
$38+3=41.$
$48+3=51.$
$58+3=61.$
$68+3=71.$
$78+3=81.$
$88+3=91.$
$98+3=101.$

Take the following combinations to 100:

$9+2=11.$
$7+4=11.$
$6+5=11.$
$10+1=11.$

$3+5+2=\ ?$
$6+4+1=\ ?$
$1+8+2=\ ?$

Exercise 14

(1) Thomas goes to school 5 days in one week. In two weeks he goes —— days.

(2) John lives 6 blocks on one side of the schoolhouse. Reynolds lives 5 blocks on the other side. The boys live —— blocks apart.

(3) Mother gave me 5 cents on Monday and 4 cents on Tuesday. I now have —— cents.

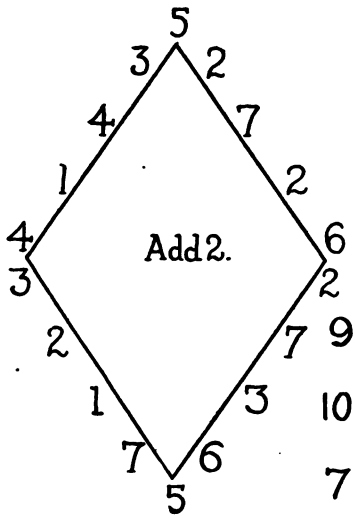
(4) Willie picked 7 boxes of berries in the morning and 4 boxes in the afternoon. He picked —— boxes of berries during the day.

(5) The telephone rang 8 times in the morning and 3 times in the afternoon. It rang —— times during the day.

(6) On Arbor day the children planted 11 trees but 3 of them died. —— trees are growing.

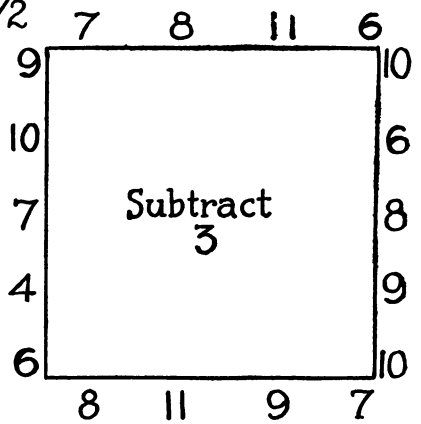
Copy the pairs of the numbers 9, 10, 11.

Exercise 15



Add 2 to each number around the diamond. Then add 3. Then add 4.

Subtract 2 from the numbers around the square. Then subtract 4.



Draw similar figures on the board, and give rapid drills on the fundamental number facts.

Write the pairs of 8, 9, 10, 11 and change each addition problem to 2 subtraction problems.

Exercise 16

How many horses can be shod with ten shoes?
How many pairs of gloves in 10 gloves?
How many pairs of hose in 11 hose?
How many pints in 8 gills?
How many quarts in 10 pints?
How many school weeks in 10 days?
How many dimes in 2 dollars?

How many cents in 2 dimes?
How many bushels in 11 pecks?
How many bushels in 8 pecks?
How many pecks in 2 bushels?
How many pints in 4 quarts?
How many quarts in 2 gallons?
How many nickels in 20 cents?
How many yards in 11 feet?
How many gills in 2 pints?

Exercise 17

Copy and memorize the following:

$2 \times 1 =$	$3 + 4 =$	$6 + 5 =$
$3 \times 2 =$	$7 + 3 =$	$8 - 4 =$
$7 \times 1 =$	$8 + 2 =$	$9 - 2 =$
$2 \times 5 =$	$9 + 1 =$	$11 - 9 =$
$6 \times 1 =$	$6 + 3 =$	$10 - 5 =$
$3 \times 3 =$	$9 - 3 =$	$6 + 5 =$
$4 \times 2 =$	$10 - 7 =$	$5 + 5 =$
$8 \times 1 =$	$11 - 5 =$	$10 - 5 =$
$9 + 1 =$	$3 + 8 =$	$6 - 4 =$
$10 \times 1 =$	$7 + 4 =$	$8 - 7 =$
$11 \times 1 =$	$3 + 3 =$	$11 - 7 =$

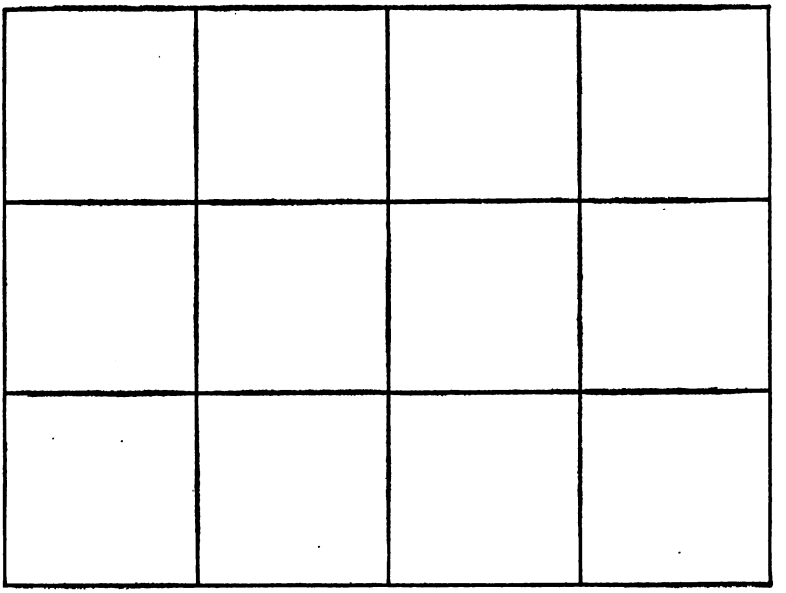
Count by 10's to 100.
Count by 11's to 100.

$\frac{1}{2}$ of 2, 4, 6, 8, 10.
$\frac{1}{3}$ of 3, 6, 9, 30.

Write the following:

gill pint quart

Exercise 18



This rectangle is —— inches long.

It is —— inches wide.

There are —— square inches in each row.

There are —— rows of square inches.

Count the square inches.

We find there are —— square inches in a rectangle —— inches long and —— inches wide.

Our pencil will travel —— inches in going around this rectangle.

Exercise 19.

Use inch squares in developing the following:

I have 12 inch squares in a row.

My row is —— inches long and —— inch wide. My row contains —— square inches.

I place 6 of these inch squares below.

I now have a rectangle —— inches long and —— inches wide.

My rectangle is —— —— foot long.

My pencil will travel —— inches in going around this rectangle.

One-half of 12 square inches is —— square inches.

One-sixth of 12 square inches is —— square inches.

With the squares show that

6	5	8	9	10	11
6	7	4	3	2	1
12	12	12	12	12	12

Exercise 20

12 things make a dozen.

We buy —— —— —— —— by the dozen.

One-half of a dozen oranges is —— oranges.

One-half of a dozen eggs is —— eggs.

6 lemons are —— —— dozen lemons.

6 apples are —— —— dozen apples.

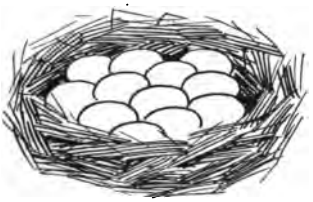
—— inches make a foot.

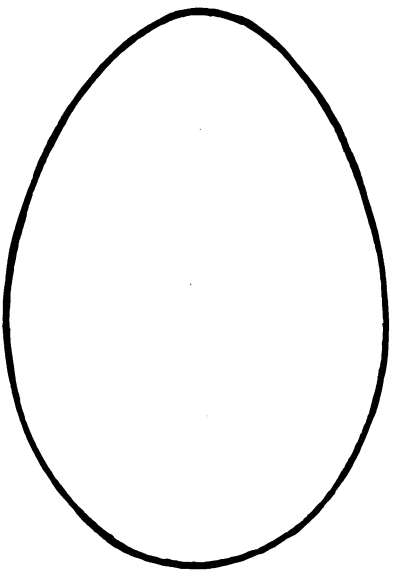
One-half foot is —— inches.

—— months make a year.

One-half year is —— months.
3 months and 3 months make —— —— year.
4 eggs and 2 eggs make —— —— dozen.
4 oranges and 8 oranges make —— dozen.
5 apples and 7 apples make a ——.
7 months and 5 months make a ——.
4 inches and 8 inches make a ——.

Exercise 21





We buy and sell eggs by the dozen.
How many eggs in the nest?
We use eggs to —— —— —— ——.
Where does the grocer get the eggs?

Did you ever hunt eggs? Did you find a dozen?
How many eggs did you find?
We want to buy and sell eggs to-morrow.
We will cut eggs like the picture out of thick paper.
Each pupil may make a dozen paper eggs. Use this pattern.

Exercise 22

This game is store-keeping.
We shall buy and sell eggs.
We shall use the one-cent pieces that we have made for our pennies.
James may be banker.
We shall use our dominoes for checks with which to draw money from the bank.
Thomas will be grocer.
To-day we can get eggs for 1 cent apiece.

"I want ten eggs. I shall give you —— cents."
"I want one-half dozen eggs. I shall give you —— cents."
"I want one dozen eggs. I shall give you —— cents."
"I want two dozen eggs. I shall give you —— cents."

Exercise 23

Let us use 12 inch cubes.
I place them in a row.
I see 2 times 12 faces.
Each face has —— corners and —— sides.
I place the cubes in 2 equal rows.
In two rows, they are —— inches long, —— inches wide, and —— inch high.

In 3 rows, they are —— inches long, —— inches wide, and —— inch high.

When we place the cubes in 2 rows we find that one-half of 12 is 6. One-sixth of 12 is 2.

When we place them in 4 rows, we find that one-fourth of 12 is 3.

When we place them in 3 rows, we find that one-third of 12 is 4.

Copy the following:

$\frac{1}{2}$ of 12 is 6. $\frac{1}{3}$ of 12 is 4.
$\frac{1}{4}$ of 12 is 3. $\frac{1}{6}$ of 12 is 2.

Exercise 24

Use inch squares to show the following:

Make a rectangle 4 inches long and 3 inches wide.

We must take our 3 inch squares 4 times to make 12 inch squares.

4 times 3 are 12. $4 \times 3 = 12$.

We must take our 4 inch squares 3 times to make 12 inch squares.

3 times 4 are 12. $3 \times 4 = 12$.

Make a rectangle 2 inches by 6 inches.

We must take our 6 square inches 2 times to make 12 square inches.

2 times 6 are 12. $2 \times 6 = 12$.

We must take our 2 square inches 6 times to make 12 square inches.

6 times 2 are 12. $6 \times 2 = 12.$

Exercise 25

Use 12 inch squares for the work below.
We find we can separate 12 things into 2 parts.
In each part there are 6 things.

We may say this as follows:

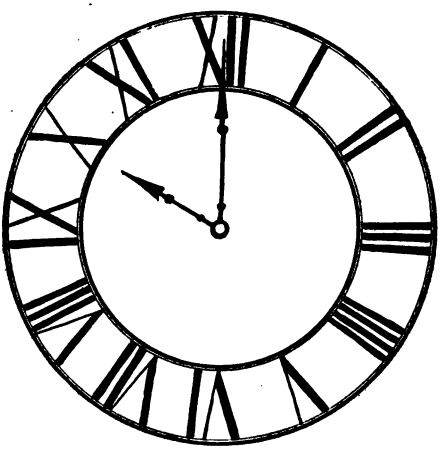
12 things divided by 2 are 6 things.
12 things $\div$ 2 = 6 things.
12 things divided by 6 are 2 things.
12 things $\div$ 6 = 2 things.

Now place the inch squares in 3 rows.

12 things divided by 3 are 4 things.
12 things $\div$ 3 = 4 things.
12 things divided by 4 are 3 things.
12 things $\div$ 4 = 3 things.

One-third is one of three equal parts.
One-third of 12 is 4.
One-fourth is one of 4 equal parts.
One-fourth of 12 is 3.
One-sixth is one of 6 equal parts.

Exercise 26



Can you tell the time of day?
What helps to tell us the time of day?
How many hours does the face of the clock represent?
To what number does this long hand point?
The long hand always points to 12 when the clock strikes the hour.
Where is the short hand? What time is it?
At what time did you come to school?

Exercise 27

Use the clock face in Exercise 26 for the following:
The short hand tells the hour.
The long hand tells the minutes before or after the hour.
What part of the hour has passed when the minute hand is at VI?

When the minute hand is at III?
When the minute hand is at IX?
How many minute spaces between XII and I? Between XII and II? Between II and IIII? Between VII and IX?
One-fourth of 12 hours is —— hours.
One-third of 12 hours is —— hours.
One-half of 12 hours is —— hours.
There are 60 minutes in one hour.
Show by the clock face how many minutes in a half hour.
In a quarter of an hour there are —— minutes.

Exercise 28

TEST

$1 \times 1 =$	$7 \times 1 =$	$2 \times 6 =$
$2 \times 1 =$	$2 \times 4 =$	$3 \times 4 =$
$3 \times 1 =$	$8 \times 1 =$	$12 \times 1 =$
$2 \times 4 =$	$3 \times 3 =$	$2 \times 7 =$
$1 \times 4 =$	$9 \times 1 =$	$7 \times 2 =$
$5 \times 1 =$	$2 \times 5 =$	$3 \times 5 =$
$6 \times 1 =$	$10 \times 1 =$	$5 \times 3 =$
$2 \times 3 =$	$11 \times 1 =$	

$\frac{1}{2}$ of 4 is ——.	$\frac{1}{2}$ of 10 is ——.
$\frac{1}{3}$ of 6 is ——.	$\frac{1}{6}$ of 12 is ——.
$\frac{1}{3}$ of 9 is ——.	$\frac{1}{3}$ of 12 is ——.
$\frac{1}{4}$ of 8 is ——.	$\frac{1}{5}$ of 15 is ——.

Copy and memorize these number facts.

Exercise 29

(1) If you buy a dozen lemons, how many will you get? Put one-half of them in a dish. How many are left?

(2) How many working days in 2 weeks?

(3) 6 two-cent stamps cost —— cents.

(4) It takes —— cents to buy 6 two-cent stamps.

(5) How much will it cost to stamp 5 letters?

(6) Delmar bought a dozen oranges; he gave 3 to his brother, 3 to his friend, and ate 3. He still has —— oranges?

(7) Place 12 squares in groups of 3.

(8) How many horses will 12 shoes shoe?

(9) James is out of school during June, July and August. How many months is he in school?

(10) How many months in one-third of a year?

Exercise 30

How many months in a year?
How many seasons in a year?
How many months in each season?
Name the seasons and the months in each season.
How many feet have 3 horses?
How many horns have 6 cows?
How many points have 4 triangles?
How many corners have 3 squares?
How many legs have 3 tables?
How many inches in a foot?

How many inches in one-half of a foot?
How many inches in one-third of a foot?
How many inches in two-thirds of a foot?
How many inches in one-fourth of a foot?
How many inches in two-fourths of a foot?

Write pairs of the numbers 12, 11, 10, 9, 8,

Exercise 31

Make concrete problems using the following combinations:

2	6	8	7	8	3
+4	+4	+2	+4	+3	+9
9	11	10	9	12	12
−2	−4	−8	−4	−8	−7
4	5	3	2	4	6
×2	×2	×3	×3	×3	×2

(1) 2 girls on one bench and 4 girls on another. $2+4=$ ——.

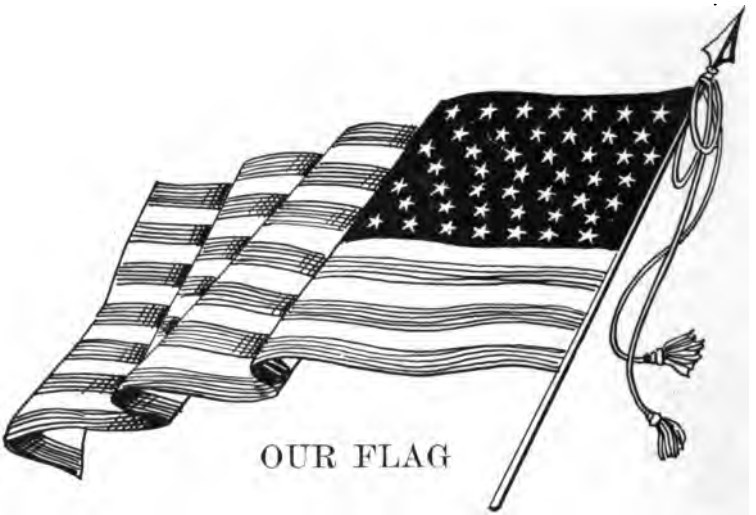
(2) If nine birds were on the fence and 2 flew away, —— birds were left on the fence. $9-2=$ ——.

(3) A boy cut 2 apples into quarters. $2\times ?=8$ quarters.

Exercise 32

TEST

$1 \times 1 =$	$12 - 4 =$	$12 \div 4 =$
$2 \times 1 =$	$11 - 3 =$	$12 \div 6 =$
$3 \times 1 =$	$9 + 2 =$	$10 \div 2 =$
$2 \times 2 =$	$12 - 5 =$	$9 \div 3 =$
$4 \times 1 =$	$6 + 5 =$	$12 \div 3 =$
$5 \times 1 =$	$8 + 4 =$	$10 \div 5 =$
$6 \times 1 =$	$7 + 3 =$	$8 \div 4 =$
$2 \times 3 =$	$12 - 7 =$	$12 \div 2 =$
$7 \times 1 =$	$11 - 6 =$	$12 \div 6 =$
$8 \times 1 =$	$10 - 4 =$	$10 \div 10 =$
$2 \times 4 =$	$8 + 2 =$	$9 \div 9 =$
$9 \times 1 =$	$12 - 6 =$	$4 \div 2 =$
$3 \times 3 =$	$12 - 8 =$	$3 \div 1 =$
$10 \times 1 =$	$11 - 4 =$	$5 \div 5 =$
$2 \times 5 =$	$9 + 6 =$	$6 \div 3 =$
$11 \times 1 =$	$12 - 9 =$	$7 \div 7 =$
$12 \times 1 =$	$11 - 5 =$	$8 \div 8 =$
$3 \times 4 =$	$10 - 7 =$	$2 \div 1 =$
$6 \times 2 =$	$10 - 8 =$	$4 \div 4 =$



Exercise 33

(Use a United States flag for this exercise.)

Count the red stripes in the flag.

Count the white stripes.

—— stripes and —— stripes are —— stripes.

If one red stripe were torn away, there would be an equal number of each. How many of each kind? How many of both kinds?

13 stripes are how many more than 12 stripes?

How many red stripes below the blue field?

How many red stripes to the left of the blue field?

Oklahoma is the last star in the flag. What number is her star?

Exercise 34

13 is 1 ten and 3 ones or units.

The pairs of 13 are:

6	8	9	10	11	12
7	5	4	3	2	1
13	13	13	13	13	13

Show the above combinations with the inch squares.

How many pairs of numbers make 13? Why?
How many more are 13 books than 12 books?
Count to 13 by 1's.
Count to 13 by 2's.
Count to 13 by 3's.
How many 4's in 13?
How many 5's in 13?
How many feet in 13 inches?
How many pecks in 13 quarts?

3	2	1
2	2	2
5	2	1
4	2	2
1	2	1

Copy and memorize the pairs of numbers that make 13.

Exercise 35

Name the odd numbers to 13.

All numbers that may be divided by 2 without a remainder are called even numbers.

Name the even numbers to 100.

Name the even numbers from 100 to 0.

Try to place 13 inch squares in two equal rows. What do you discover?

13 cents less 1 dime are —— cents.
13 cents less 1 nickel are —— cents.
13 inches less 1 foot is —— inch.
13 quarts less 1 gallon are —— quarts.
13 quarts less 4 quarts are —— pints.
13 dimes less 1 dollar are —— dimes.
13 eggs less 1 dozen eggs is —— egg.
13 pecks less 2 bushels are —— pecks.
13 quarts less 1 peck are —— quarts.
13 gills less 5 gills are —— pints.

Write: cents, dimes, nickels, quarts.

Exercise 36

13 is 4 more than ?
13 is 9 more than ?
13 is 5 more than ?
13 is 3 more than ?

13 is 2 more than ?
13 is 7 more than ?
13 is 6 more than ?
13 is 11 more than ?

$2+3+?=13$
$3+4+?=13$
$2+7+?=13$
$3+3+?=13$

$4+5+?=13$
$4+6+?=13$
$5+3+?=13$
$6+5+?=13$

$2+2+2+2+2+2+1=$?	1	3	4	2
$3+3+3+3+1=$?	2	4	5	1
$4+4+4+1=$?	3	5	2	3
$5+5+3=$?	8	2	1	5
$6+6+1=$?	2	1	3	2

Find $\frac{1}{2}$ of each of the following numbers:

2, 4, 5, 6, 7, 8, 9, 10, 11, 12.

Exercise 37

(1) If George had 13 trees and tried to set them in 2 rows, he would have to set 7 trees in one row and —— trees in the other.

(2) 13 birds in the tree. 9 flew away. —— birds were still in the tree.

(3) What is the largest piece of money in 13 cents?

(4) 13 quarts of berries will fill —— gallon buckets and —— ——.

(5) I paid 1 dime for a tablet. How much change did I get from 13 cents?

(6) The milkman had 13 bottles of milk in his wagon. He left 4 bottles with us. How many are still in the wagon?

(7) The farmer has 13 horses. 8 horses are at work. How many teams are idle?

(8) A livery man has 13 carriages. 5 carriages are out. How many are left in the barn?

Exercise 38

TEST

$13 \div 2 =$	$2 \times 4 =$	2
$13 \div 10 =$	$3 \times 3 =$	1
$13 \div 3 =$	$4 \times 3 =$	4
$13 \div 4 =$	$3 \times 2 =$	5
$13 \div 5 =$	$5 \times 2 =$	6
$13 - 7 =$	$2 \times 6 =$	8
$13 - 3 =$	$3 \times 4 =$	1
$13 - 4 =$	$1 \times 12 =$	3
$13 - 8 =$	$1 \times 10 =$	4
$13 - 9 =$	$2 \times 1 =$	2
$13 - 6 =$	$8 + 2 =$	1
$13 - 1 =$	$9 + 4 =$	6
$13 - 13 =$	$8 + 5 =$	2
$13 - 5 =$	$6 + 7 =$	5
		4
		6
		8
		3

$\frac{1}{2}$ of 12 =	$\frac{1}{5}$ of 10 =	$\frac{1}{4}$ of 8 =
$\frac{1}{3}$ of 12 =	$\frac{1}{6}$ of 12 =	$\frac{1}{3}$ of 6 =

Copy the number facts on this page.

Exercise 39

The pairs of the number 14 are:

7	8	9	10	11	12	13
7	6	5	4	3	2	1
14	14	14	14	14	14	14

How many pairs of numbers in 14? Why?
Use inch squares to show each combination.
Also take 14 inch squares and show the two subtraction problems for each addition problem.

7	14	14	8	14	14
+7	−7	−7	+6	−8	−6
14	7	7	14	6	8
9	14	14	10	14	14
+5	−9	−5	+4	−10	−4
14	5	9	14	4	10

There were 14 children in the class at school.
6 were kept at home with the measles, how many were at school? $14 - 6 = ?$
Write the pairs of the number 14, three times.

Exercise 40

In 1 week how many days?
In 2 weeks how many days?
In 2 weeks how many school days?
2 weeks less 10 days are —— days.
How many days in 2 weeks that you do not go to school?

How many half-days in 1 week?

If a street car conductor gets 2 dollars a day, how many dollars will he make in a week?

If he received 1 dollar a day, how long would it take him to earn 14 dollars?

In 14 days how many Sundays? Saturdays?

If in 2 weeks you spend 10 days in school, how many days are you out of school?

There are 9 boys in the A class and 5 boys in the B class. In both classes there are —— boys.

Exercise 41

Take 14 squares and place them in 2 equal rows.

One-half of 14 is ——.

One-seventh of 14 is ——.

$2 \times 7 = 14.$ $14 \div 2 = 7.$

$\frac{1}{2}$ of $14 =$ ——. $\frac{1}{7}$ of $14 =$ ——.

In 14 days there are —— weeks.

In 14 pints there are —— quarts.

In 14 quarts there are —— gallons and —— ——.

In 14 inches there are —— foot and —— ——.

In 14 cents there are —— dime and —— ——.

In 7 pounds there are —— half-pounds.

In 14 lemons there are —— dozen and —— ——.

In 14 months there are —— year and —— ——.

In 14 pecks there are —— bushels and —— ——.

In 14 dimes there are —— dollar and —— ——.

Write tables of 7 as above, three times each.

Exercise 42

TEST

$$14 - 2 - 2 - 2 - 2 - 2 - 2 =$$
$$14 - 3 - 4 + 3 + 4 - 3 - 3 =$$
$$14 - 7 + 6 + 2 - 2 - 5 - 2 =$$
$$14 - 10 + 4 + 2 + 1 - 3 - 5 =$$
$$2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 =$$
$$3 \times 3 + 1 + 2 + 2 =$$

Add 2 to 6, 8, 3, 9, 4, 10, 7, 5.
Add 3 to 5, 2, 8, 6, 3, 9, 11, 10.
Add 5 to 5, 3, 1, 8, 6, 2, 7, 9.
Subtract 3 from 8, 9, 6, 5, 10, 14, 7, 13.
Subtract 5 from 10, 5, 7, 6, 9, 12, 13, 14.
Divide 10 by 2; 12 by 3; 14 by 7; 9 by 3.
Multiply 2 by 2, 6, 7, 3, 5, 4.

James has to walk 2 blocks and then he can ride 12 blocks. His home is —— blocks from school.

Exercise 43

(1) In going home, Charles rode 9 miles on the train and 5 miles in the buggy. To reach his home how many miles did he travel?

(2) Charles lives 8 blocks North of the college and Walter lives 6 blocks South. How far apart do the boys live?

(3) Elizabeth lives 14 blocks South of the college; James lives 3 blocks South. How far apart do Elizabeth and James live?

(4) Gillette has 2 chicken coops with 7 chickens in each. How many chickens has he?

(5) There are 14 trees to be planted in two equal rows in front of the lawn. How many trees in each row?

(6) Jane bought 8 cents worth of ribbon. How much change will she get if she hands the clerk a dime?

(7) How much will 7 two-cent stamps cost?

Exercise 44

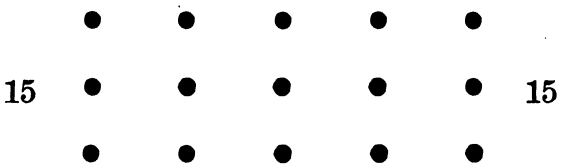
TEST

$2 \times 2 =$	$4 \div 2 =$	$4 \div 2 =$
$3 \times 2 =$	$6 \div 3 =$	$6 \div 2 =$
$6 \times 2 =$	$12 \div 6 =$	$12 \div 2 =$
$3 \times 3 =$	$9 \div 3 =$	$9 \div 3 =$
$4 \times 3 =$	$12 \div 4 =$	$12 \div 3 =$
$5 \times 1 =$	$5 \div 5 =$	$5 \div 1 =$
$3 \times 1 =$	$3 \div 3 =$	$3 \div 1 =$
$2 \times 7 =$	$14 \div 2 =$	$14 \div 7 =$

Write the pairs of 7 from memory.
Write the pairs of 9 from memory.
Write the pairs of 14 from memory.
In two weeks there are —— working days.
How many eyes have 7 birds?
Think of a word having 7 letters.
How many letters in the word Wednesday?
How many letters less in the word Sunday?

$2 \times 6 + 2 = ?$	$3 \times 3 + ? = 14$
$2 \times 7 - 3 = ?$	$4 \times 3 + ? = 14$

Exercise 45



Count by 3's and 5's to 15.

The number 15 is 1 ten and 5 units.
The number 15 is —— more than 14.
The number 15 is —— more than 10.
The number 15 is —— more than 9.
The number 15 is —— more than 6.
The number 15 is —— more than 11.
The number 15 is —— more than 12.
The number 15 is —— more than 8.

The combinations that make the number 15 are:

7	9	10	11	12	13	14
8	6	5	4	3	2	1
15	15	15	15	15	15	15

Copy each of the above combinations four times.

Exercise 46

Place 15 inch squares in a row.
My row is —— foot and —— inches long.
(Use ruler.)

I can make a rectangle —— inches long and —— inches wide.

I find there are —— fives in 15. $\frac{1}{3}$ of 15 is ——.

One-third of 15 is ——.

Two-thirds of 15 are ——. $\frac{2}{3}$ of 15 are ——.

Three-thirds of 15 are ——.

I find there are —— threes in 15. $\frac{1}{5}$ of 15 is ——.

One-fifth of 15 is ——.

Two-fifths of 15 are ——. $\frac{2}{5}$ of 15 are ——.

Three-fifths of 15 are ——.

Four-fifths of 15 are ——. $\frac{3}{5}$ of 15 are ——.

Five-fifths of 15 are ——.

Show with the squares that you take five 3 times to make 15.

3 times 5 are 15.

I take three 5 times to make 15.

5 times 3 are 15.

Exercise 47

Copy and change each of the following addition problems to two subtraction problems:

Add:

7	8	9	6	8	9	6	8
8	3	4	5	6	3	7	4
8	3	8	6	11	9	8	9
1	7	5	9	3	1	2	5

2×6 books are ——. 3×4 boxes are ——.
3×3 pencils are ——. 2×5 cents are ——.
2×7 boys are ——. 3×5 cents are ——.

I can buy —— tablets for 15 cents.
I can buy —— pencils for 15 cents.
I can buy —— oranges for 15 cents.

Write the odd numbers to 100.

Exercise 48

There are 30 days in June.
In one-half of the month of June there are —— days.
15 days are —— weeks and —— day.
15 feet are —— yards.
15 pints are —— quarts and —— pint.
15 months are —— year and —— months.
15 things are —— dozen and —— things.
15 dimes are —— dollar and —— dimes.
15 cents are —— dime and —— cents.
15 inches are —— foot and —— inches.
15 school days are —— school weeks.
15 cents will buy —— —— and —— ——.
What two pieces of money make 15 cents.
One-half foot and what number of inches make 15 inches?
How many squares can you make out of 15 inch squares? How many will you have left?

Exercise 49

TEST QUESTIONS

How many points have 5 triangles?
How many feet have 3 cows?
How many gloves will 7 ladies wear?
How many shoes will 10 ladies wear?
How many yards will 12 feet make?
How many quart jars will 2 gallons fill?
How many pint bottles will 7 quarts fill?
How many fingers and thumbs on 3 hands?
How many cents in 3 nickels?
How many cents in a dime and a nickel?
How many pint cups will 12 gills fill?
How many feet will 5 yards make?
How many points have 3 stars?
How many stripes has our flag?
How many half-dozens in 15 eggs?
How many threes in 15?

Write each of these words 5 times:

pennies dimes nickel

Exercise 50

In the following, change each combination of the number 15 to two subtraction problems.

Add:

7	9	5	4	3	2	1
8	6	10	11	12	13	14

In the following, change the multiplication facts to two division facts:

$2 \times 6 =$ ——.	$12 \div 2 =$?	$12 \div 6 =$?
$3 \times 4 =$ ——.	$12 \div 3 =$?	$12 \div 4 =$?
$7 \times 2 =$ ——.	$14 \div 7 =$?	$14 \div 2 =$?
$3 \times 5 =$ ——.	$15 \div 3 =$?	$15 \div 5 =$?

We can write division problems four ways:

(1)
12 divided by 3 are 4.

(2)
$12 \div 3 = 4.$

(3)
$3\overline{)12}$
4

(4)
$\frac{12}{3} = 4.$

3) 9	5)10	2)10	2)13	7)14
3)15	4)15	5)15	6)15	7)15

Exercise 51

(1) The boy had 15 apples in his basket. He sold 1 dozen. How many had he left?

(2) There were 9 roses on 1 bush and 6 roses on the other. On both bushes there were —— roses.

(3) Lucy and Mary each bought a half-dozen eggs. They both bought —— eggs or —— dozen.

(4) Lucy used 8 yards for her skirt and 3 yards for her waist. She used —— yards for her dress.

(5) The trimmer used 5 yards of ribbon on each hat. 3 hats required —— yards.

(6) Beatrice bought 6 yards of lace for one dress and 4 yards for another. Beatrice used —— yards on both dresses.

(7) Raisins are 15 cents a pound. $\frac{1}{3}$ of a pound costs —— cents.

(8) 8 boys and 7 girls were studying arithmetic. —— children were studying arithmetic.

Exercise 52

ORAL

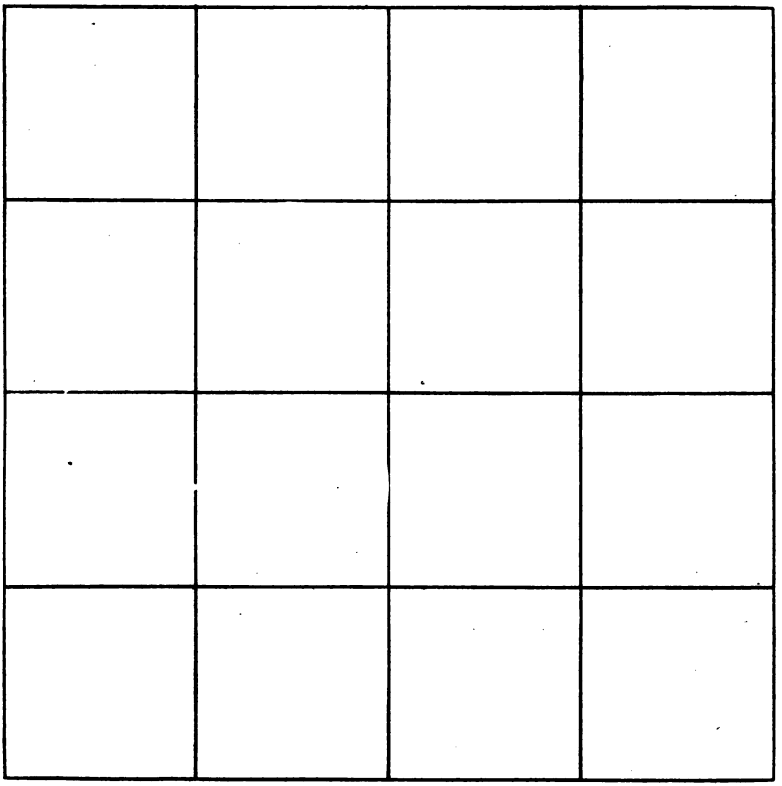
Add 2 to 3, 8, 5, 7, 6, 4, 9.
Add 5 to 2, 9, 8, 3, 10, 7, 6.
Add 6 to 7, 1, 8, 9, 3, 5, 3.
Add 4 to 9, 7, 10, 11, 3, 8, 4.
Multiply 3, 7, 5, 4, 6, 2 by 2
Divide 14, 12, 10, 8, 6, 4, by 2.
Divide 15, 12, 9, 6, 3, 10, by 3.
Count backwards from 99 by 10's.
Count backwards from 97 by 10's.

WRITTEN WORK

Take the following combinations to 100:

$12 - 8 = 4.$ $13 - 7 = 6.$
$12 - 5 = 7.$ $13 - 9 = 4.$
$7 + 8 = 15.$ $9 + 6 = 15.$

Exercise 53



We have reached another square in our numbers. What is it the square of?

How many inch squares will it take to make this square?

How many inches will my pencil travel in going around this square?

Name the other squares we have studied.

Exercise 54

Take 16 inch squares and make a 4-inch square.
How many 4's in 16? One-fourth of 16 is ——.
Two-fourths of 16 are ——.
Three-fourths of 16 are ——.
Take the 16 inch squares and make a rectangle.
How long is the rectangle? How wide?
How many inches will the pencil travel in going around this rectangle?
What is one-half of 16 inch squares?
Waht are two-halves of 16 inch squares?
What is one-eighth of 16 inch squares?
What are two-eighths of 16 inch squares?
What are three-eighths of 16 inch squares?
What are four-eighths of 16 inch squares?
What are five-eighths of 16 inch squares?
What are six-eighths of 16 inch squares?
What are seven-eighths of 16 inch squares?
What are eight-eighths of 16 inch squares.

Exercise 55

The pairs of numbers that make 16 are:

8	9	10	11	12	13	14	15
8	7	6	5	4	3	2	1
16	16	16	16	16	16	16	16

Commit the above to memory.

4 times 4 are ——. 16 divided by 4 are —.
2 times 8 are ——. 16 divided by 8 are —.

$\frac{1}{2}$ of 16 is ——. $\frac{1}{4}$ of 16 is ——.
$\frac{1}{8}$ of 16 is ——. $\frac{3}{4}$ of 16 are ——.

(1) Frank is 9 years old. How many years must he live to be 16 years old?

(2) The baker sent 8 loaves of bread to each of two stores. How many loaves did he sell?

(3) Mother has 16 pieces of candy. She wants to divide them equally among her two daughters and two sons. How many pieces will each child get?

Exercise 56

Write pairs of 16 from memory and change each addition fact to two subtraction facts, as:

9	16	16
+7	−9	−7

(1) There were 16 boys and 7 girls on the car. How many more boys than girls?

(2) Measure a 4 foot square table. How many square feet of oil cloth will it take to cover the top of it?

(3) If you want the above cover to fall 2 inches over each edge, how much oil cloth must you buy?

(4) Mrs. A. bought 2 pecks of cherries. How many quarts did she get?

(5) 16 pints of jelly are —— quarts of jelly.

(6) Mary's doll house is 4 feet square. If she could buy carpet 1 foot wide, how many square feet of carpet would it take to cover the floor? How many yards 1 foot wide?

Exercise 57

$11 + ? = 15$	$? + 4 = 5$	$2 \times 4 = ?$
$3 + ? = 16$	$? + 3 = 8$	$2 \times 5 = ?$
$8 + ? = 16$	$? + 2 = 9$	$6 \times 2 = ?$
$4 + ? = 10$	$? + 6 = 11$	$? \times 4 = 12$
$3 + ? = 13$	$? + 7 = 12$	$? \times 3 = 9$
$4 + ? = 13$	$? + 4 = 13$	$? + 2 = 8$
$5 + ? = 14$	$? + 3 = 14$	$? \times 5 = 15$
$6 + ? = 13$	$? + 2 = 11$	$4 \times 4 = ?$
$7 + ? = 12$	$? + 7 = 13$	$3 \times ? = 12$
$8 + ? = 14$	$? + 8 = 15$	$? \times 6 = 12$
$9 + ? = 15$	$? + 9 = 16$	$5 \times ? = 15$
$6 + ? = 12$	$? + 6 = 15$	$4 \times ? = 12$

$7 + 8 = ?$	$12 - ? = 7$	$16 \div 4 = ?$
$8 + 5 = ?$	$13 - ? = 5$	$16 \div ? = 8$
$5 + 6 = ?$	$14 - 7 = ?$	$12 \div 3 = ?$
$6 + 3 = ?$	$13 - 8 = ?$	$10 \div ? = 2$
$9 + 2 = ?$	$15 - 9 = ?$	$9 \div 3 = ?$
$10 + 5 = ?$	$16 - 5 = ?$	$12 \div 2 = ?$

Exercise 58

16 ounces make a pound.

We buy —— —— —— —— —— —— by the pound.

If candy is 20 cents a pound, 8 ounces will cost —— cents.

If beef is 10 cents a pound, one-half pound is worth —— cents.

If flour is 5 cents a pound, one-half pound costs —— cents.

If cheese is 20 cents a pound, one-fourth of a pound costs —— cents.

At 40 cents a pound, 4 ounces of candy costs —— dime.

At 32 cents a pound, 8 ounces will cost —— cents.

One-half of a pound is —— ounces.

One-fourth of a pound is —— ounces.

Two-fourths of a pound are —— ounces.

Three-fourths of a pound are —— ounces.

Exercise 59

Use inch squares and work out the pairs of numbers that make 17.

9	7	6	5	4	3	2	1
8	10	11	12	13	14	15	16

In working out these combinations see how many familiar combinations you have.

How many new combinations?

How many have you seen before?

Change each addition combination in this Exercise to two subtraction problems.

Is 17 an odd or even number? Why?

17 is made of how many tens and units?

16 is made of how many tens and units?

15 is made of how many tens and units?

14 is made of how many tens and units?

13 is made of how many tens and units?

12 is made of how many tens and units?

11 is made of how many tens and units?

Exercise 60

(1) There are 10 boys and 7 girls in the class. How many children?

(2) Why is it you can add the number of boys and girls? "Because we call them children."

(3) What must you call 8 books and 9 pencils in order to add them?

(4) What must you call 11 birds and 6 chickens in order to add them?

(5) What must you call 13 men and 4 women that you may add them?

(6) What must you call 5 pigs and 2 horses that you may add them?

(7) How must you change quarts and pints in order to add them?

(8) How can you subtract days from 1 month?

(9) What must you do to add inches and feet?

Exercise 61

We have learned that we can add only things that have the same name.

We also have learned that we can subtract only things that have the same name.

This is why we must always write dollars in the same column and cents in the same column to add or subtract them.

Add	Subtract	Add
\$10.05	\$20.60	\$3.01
\$ 1.30	\$10.30	\$2.10
\$ 3.21		\$1.15

If we have a dollar and we earn 50 cents, we have a dollar and 50 cents, or one dollar and a half.

If we had a dollar and a half and spent a quarter of dollar, how much money did we have left?

Let the children solve a number of similar problems from the board.

Exercise 62

One dollar is equal in value to —— half dollars.

One-half dollar is equal in value to —— quarters.

One-half dollar and one quarter are —— cents.

Five dimes and a quarter of a dollar are —— cents.

Two dimes and a nickel are —— cents or —— ——.

Two dimes and a nickel are what part of a dollar?

Five nickels are what part of a dollar?

Five dimes are what part of a dollar?

Copy the following addition facts, and change each one to two subtraction problems:

2	7	6	7	8	9	7	8	9
8	9	3	5	6	9	6	5	8

5	9	7	9	6	5	8	9	7
7	4	8	5	9	6	3	2	3

Exercise 63

9 + 8 =	2 × 5 =	3	4
6 + 5 =	10 ÷ 2 =	3	4
8 + 6 =	6 × 2 =	3	4
9 + 7 =	12 ÷ 6 =	3	4
10 − 5 =	12 ÷ 2 =	3	4
11 − 2 =	3 × 5 =	3	4
13 − 9 =	15 ÷ 3 =	3	4
10 + 4 =	9 × 1 =	3	4
9 + 6 =	15 ÷ 5 =	3	4
12 + 5 =	12 ÷ 4 =	3	4
11 + 6 =	2 × 4 =	3	4
14 + 3 =	12 ÷ 3 =	3	4
12 − 7 =	4 × 4 =	3	4
7 + 10 =	8 ÷ 4 =	3	4
8 + 5 =	16 ÷ 8 =	3	4
17 − 9 =	3 × 3 =	3	4
15 − 9 =	16 ÷ 4 =	3	4
11 − 9 =	17 ÷ 9 =	3	4

Exercise 64

7	1	5	3	6	9	2
			+3			

Add 3 to each number given above. Also add 2, 4, 5, 6, 7, and 8 to each number given above.

Name the pairs of numbers that make 10.

Name the pairs of numbers that make 16.

Name the pairs of numbers that make 17.

(1) There are 17 dollars in my pocketbook. If I pay a milk bill of 5 dollars, how many dollars have I left?

(2) If it costs 8 dollars to travel to Muskogee from Oklahoma City, what will it cost to go to Muskogee and return?

(3) If Charles makes 6 dollars a day in a mill, what will he make in 2 days?

(4) In 17, how many twos? How many threes? How many fours? How many fives? How many sixes?

Exercise 65

18 is —— ten and —— units.

We use —— figures to write 18.

Use inch squares and show all the pairs of numbers that make 18.

9	10	11	12	13	14	15	16	17
9	?	?	?	?	?	?	?	?

How many pairs in 18 things?

Make a rectangle 6 inches long and —— inches wide with your 18 inch squares.

6 times what are 18?
$\frac{2}{6}$ of 18 are ——.
$\frac{4}{6}$ of 18 are ——.
$\frac{1}{6}$ of 18 is ——.
$\frac{3}{6}$ of 18 are ——.
$\frac{5}{6}$ of 18 are ——.

Copy pairs of 17, 16, 15, 14 from memory.
Copy pairs of 18 from the board.

Exercise 66

Take 18 inch squares and make a rectangle 9 inches long and —— inches wide.

How many 2's in 18?
$\frac{1}{2}$ of 18 is ——.
$\frac{1}{9}$ of 18 is ——
$\frac{3}{9}$ of 18 are ——.
$\frac{5}{9}$ of 18 are ——.
$\frac{7}{9}$ of 18 are ——.
How many 9's in 18?
$\frac{2}{2}$ of 18 are ——.
$\frac{2}{9}$ of 18 are ——.
$\frac{4}{9}$ of 18 are ——.
$\frac{8}{9}$ of 18 are ——.
$\frac{9}{9}$ of 18 are ——.

Copy and solve the following:

2 × ? are 18.
9 × ? are 18.
3 × 5 are ——.
4 × 4 are ——.
2 × 8 are ——.
3 × 3 are ——.
5 × 3 are ——.
3 × ? are 18.
6 × ? are 18.
3 + ? are 12.
2 + ? are 12.
2 + ? are 10.
2 + ? are 14.
3 + ? are 15.

Exercise 67

1 dozen and a half eggs are —— eggs.

1 foot and 6 inches are —— inches.

1 year and 6 months are —— months.

In 18 working days how many weeks?

In 18 feet how many yards?

In 18 pints how many quarts?

In 1 square yard how many square feet?

In 18 pecks how many bushels?

In 18 inches how many feet?

In 18 gills how many pints?

In 18 cents how many dimes?

In 18 cents how many nickels?

In 18 days how many weeks?

In 18 months how many years?

In 18 weeks how many months?

Write the pairs of 18 and change each pair to two subtraction problems.

Exercise 68

How many 2's in 18?	4	5	6
How many 3's in 18?	4	5	6
How many 4's in 18?	4	5	6
How many 5's in 18?	4	5	6
How many 6's in 18?	4	5	6
How many 7's in 18?	4	5	6
How many 8's in 18?	4	5	6
How many 9's in 18?	4	5	6

(1) There are 10 quarts of cherries on the table and 8 quarts of berries. How many quarts of fruit?

(2) 9 trees in one row. In two rows there are —— trees.

(3) 3 half-dozen eggs are —— eggs.

(4) How many 2-cent stamps can be bought for 18 cents?

(5) How many 3-cent stamps can be bought for 18 cents?

Write numbers to 100.

Exercise 69

If necessary, use objects in solving the following problems.

19 is —— ten and —— units.
19 is 5 more than ——.
19 is 10 more than ——.
19 is 3 × 5 and ——.
19 is 9 more than ——.
19 is 3 × 6 and ——.
18 is 2 + 7 and ——.
19 is 2 × 8 and ——.
17 is 3 × 5 and ——.
17 is 4 × 4 and ——.
15 is 3 × 4 and ——.
14 is 2 × 6 and ——.
17 is 2 × 7 and ——.
19 is 3 × 3 and ——.
19 is 5 × 2 and ——.
19 is 2 × 5 and ——.
19 is 2 × 9 and ——.

2	4
1	2
3	3
4	7
5	1
6	8
7	1
6	8
2	1
5	5
4	6
3	4
4	2

Copy the following problems:

9	8	7	6	5	4	3	2	1
10	11	12	13	14	15	16	17	18
19	19	19	19	19	19	19	19	19

Exercise 70

TEST

$1 \times 1 =$	$3 \times 4 =$	$15 \div 5 =$
$2 \times 1 =$	$2 \times 7 =$	$9 \div 3 =$
$3 \times 1 =$	$7 \times 2 =$	$10 \div 3 =$
$1 \times 4 =$	$3 \times 5 =$	$12 \div 6 =$
$2 \times 2 =$	$5 \times 3 =$	$12 \div 2 =$
$1 \times 5 =$	$4 \times 4 =$	$16 \div 4 =$
$2 \times 3 =$	$2 \times 8 =$	$18 \div 3 =$
$1 \times 6 =$	$2 \times 9 =$	$8 \div 9 =$
$1 \times 7 =$	$3 \times 6 =$	$18 \div 6 =$
$2 \times 4 =$	$10 \div 2 =$	$6 \div 3 =$
$1 \times 8 =$	$12 \div 3 =$	$9 + 6 =$
$3 \times 3 =$	$14 \div 2 =$	$8 + 7 =$
$1 \times 9 =$	$15 \div 3 =$	$6 + 5 =$
$10 \times 1 =$	$18 \div 9 =$	$7 + 9 =$
$11 \times 1 =$	$16 \div 2 =$	$9 + 9 =$
$2 \times 6 =$	$10 \div 5 =$	$8 + 5 =$
$12 \times 1 =$	$12 \div 4 =$	$9 + 3 =$

Copy this page and recite orally.

$\frac{1}{3}$ of 9 is ——.	$\frac{1}{4}$ of 16 is ——.
$\frac{1}{5}$ of 15 is ——.	$\frac{1}{6}$ of 18 is ——.
$\frac{1}{4}$ of 12 is ——.	$\frac{1}{3}$ of 18 is ——.
$\frac{1}{2}$ of 16 is ——.	$\frac{1}{4}$ of 18 is ——.

Exercise 71

(1) It requires 1 week and —— days to make 19 days.

(2) It requires 1 year and —— month to make 13 months.

(3) It requires 4 gallons and —— quarts to make 19 quarts.

(4) It requires 4 gallons and —— quart to make 17 quarts.

(5) It requires 3 yards and —— feet to make 13 feet.

(6) Mr. A. lives 10 miles east of St. Louis, and Mr. B. lives 8 miles west. How far apart do they live?

(7) William lives 9 miles from town. He can ride 7 miles on the Interurban car. How far must he walk?

(8) Henry had 18 marbles and he sold a dozen. How many had he then?

(9) —— half-dozen eggs and —— are 19 eggs.

Count by 2's to 100 and then back to 0.

Count by 10's to 100 and then back to 0.

Count by 5's to 100 and then back to 0.

Exercise 72

We have learned the multiplication table to 18. We shall learn five more multiplication facts today.

$2 \times 10 = 20.$ $\quad$ $20 \div 2 = 10.$ $\quad$ $20 \div 10 = 2.$

$4 \times 5 = 20.$ $\quad$ $20 \div 4 = 5.$ $\quad$ $20 \div 5 = 4.$

$3 \times 7 = 21.$ $\quad$ $21 \div 3 = 7.$ $\quad$ $21 \div 7 = 3.$

$2 \times 11 = 22.$ $\quad$ $22 \div 11 = 2.$ $\quad$ $22 \div 2 = 11.$

$3 \times 8 = 24.$ $\quad$ $24 \div 3 = 8.$ $\quad$ $24 \div 8 = 3.$

$\frac{1}{3}$ of 21 = $\quad$ $\frac{1}{3}$ of 24 =

$\frac{1}{2}$ of 20 = $\quad$ $\frac{1}{5}$ of 20 =

$\frac{1}{4}$ of 20 = $\quad$ $\frac{1}{8}$ of 24 =

$\frac{1}{7}$ of 21 =

Copy each of the above multiplication facts five times; each division fact two times.

Exercise 73

Write the pairs of 10, 11, 12, 13, 14, 15, 16.

Change each of these addition facts to two subtraction facts.

Take the combination $8 + 6 = 14$ to 100.

$8 + 6 = 14.$	$10 - 2 = 8.$
$18 + ? = ?$	$20 - 2 = 18.$
$28 + ? = ?$	$30 - 2 = 28.$
$38 + ? = ?$	$40 - 2 = 38.$
$48 + ? = ?$	$50 - 2 = 48.$
$58 + ? = ?$	$60 - 2 = 58.$
$68 + ? = ?$	$70 - 2 = 68.$
$78 + ? = ?$	$80 - 2 = 78.$
$88 + ? = ?$	$90 - 2 = 88.$
$98 + ? = ?$	$100 - 2 = 98.$

$3 + 5 = 8$; $7 + 3 = 10$; $6 + 7 = 13.$

Exercise 74

Try to learn five new multiplication facts today. Use inch squares to show these facts.

$4 \times 6 = 24.$	$4)\underline{24}$	$6)\underline{24}$
$2 \times 12 = 24.$	$5)\underline{25}$	$5)\underline{20}$
$5 \times 5 = 25.$	$3)\underline{27}$	$9)\underline{27}$
$3 \times 9 = 27.$	$4)\underline{28}$	$7)\underline{28}$
$4 \times 7 = 28.$		

Copy the above multiplication facts five times.

$\frac{1}{3}$ of 27 is ——.
$\frac{1}{4}$ of 28 is ——.
$\frac{2}{3}$ of 27 are ——.
$\frac{1}{7}$ of 28 is ——.
$\frac{1}{5}$ of 25 is ——.
$\frac{2}{5}$ of 25 are ——.
$\frac{1}{3}$ of 21 is ——.
$\frac{1}{11}$ of 22 is ——.
$\frac{1}{10}$ of 20 is ——.
$\frac{2}{10}$ of 20 are ——.

Copy the above division facts.

Exercise 75

Use inch squares to show the following:

$\frac{1}{3}$ of 24 is ——.
$\frac{2}{3}$ of 24 are ——.
$\frac{3}{3}$ of 24 are ——.
$\frac{1}{8}$ of 24 is ——.
$\frac{2}{8}$ of 24 are ——.
$\frac{3}{8}$ of 24 are ——.

$\frac{1}{6}$ of 18 is ——.
$\frac{2}{6}$ of 18 are ——.
$\frac{3}{6}$ of 18 are ——.
$\frac{1}{5}$ of 15 is ——.
$\frac{1}{7}$ of 21 is ——.
$\frac{2}{7}$ of 21 are ——.

Multiply 7, 9, 8, 5, 10, 6, by 2.
Multiply 6, 4, 5, 2, 7, 9, 10 by 3.

Add 4 to 6, 3, 2, 7, 9, 10.

Subtract 4 from 6, 9, 10, 14, 12, 8, 13.
Subtract 7 from 10, 12, 17, 19, 20, 15, 18.

Subtract 6 from 6, 9, 14, 16, 12, 8, 11.

Subtract 9 from 10, 14, 9, 12, 18, 15, 13.

Exercise 76

(1) At 5 cents apiece, what will 5 pencils cost?

(2) At 3 cents a yard, what will 8 yards of calico cost?

(3) At 2 cents apiece, what will a dozen eggs cost?

(4) I paid 27 cents for 3 tablets. What did each tablet cost?

(5) A man gave 24 dollars for 3 hogs. Each hog cost —— dollars.

(6) Elizabeth gave 10 cents for some thread and 10 cents for shoe strings. She gave the merchant 25 cents. How much change did she receive?

(7) In 28 days how many weeks?

(8) In 24 oranges how many dozen?

(9) In 27 feet how many yards?

(10) In 21 cents how many dimes?

(11) In 24 quarts how many gallons?

Exercise 77

Try to learn five more multiplication facts today. Copy each five times.

6 × 5 are 30.
3 × 10 are 30.
4 × 8 are 32.
3 × 11 are 33.
5 × 7 are 35.

Division

$\frac{30}{6} = ?$ $\frac{30}{5} = ?$ $\frac{30}{3} = ?$

$\frac{30}{10} = ?$ $\frac{32}{4} = ?$ $\frac{32}{8} = ?$

$\frac{33}{3} = ?$ $\frac{33}{11} = ?$ $\frac{35}{5} = ?$

---

2 × 10 = ?	2 × 12 = ?	8 + 7 = ?
3 × 7 = ?	6 × 3 = ?	9 + 7 = ?
4 × 6 = ?	5 × 4 = ?	8 + 6 = ?
5 × 5 = ?	6 × 5 = ?	7 + 5 = ?
3 × 8 = ?	7 × 4 = ?	6 + 9 = ?

---

3 times 8, 9, 3, 5, 7.
4 times 1, 5, 6, 3, 4.
5 times 2, 3, 1, 4, 5.
6 times 3, 1, 2, 5, 4.

One-half of —— is 6.
One-half of —— is 9.
One-third of —— is 3.
One-fourth of —— is 4.
One-fifth of —— is 3.

Use the above for oral drill.

Exercise 78

Try to learn five more multiplication facts.

$6 \times 6 = 36.$ $4 \times 10 = 40.$
$3 \times 12 = 36.$ $8 \times 5 = 40.$
$4 \times 9 = 36.$

Division facts.

$36 \div 6 = 6.$ $40 \div 10 = 4.$
$36 \div 9 = 4.$ $40 \div 4 = 10.$
$36 \div 4 = 9.$ $40 \div 8 = 5.$
$36 \div 3 = 12.$ $40 \div 5 = 8.$
$36 \div 12 = 3.$

Copy the multiplication facts given above 5 times and the division facts once.

(1) If Henry worked 6 days in 1 week, in 6 weeks he would work —— days.

(2) Bessie bought 9 post cards at 4 cents each. She paid —— cents. How much change would she receive from 4 dimes?

(3) Each of 4 boys paid 10 cents for drawing paper. How much did they pay?

(4) At 5 cents a pound, how much will 8 pounds of sugar cost?

Exercise 79

TEST IN MULTIPLICATION AND DIVISION

$3 \times 5 =$	$36 \div 4 =$	100	32
$6 \times 2 =$	$40 \div 8 =$	−2	−3
$3 \times 6 =$	$27 \div 9 =$	−2	−3
$7 \times 3 =$	$30 \div 5 =$	−2	−3
$9 \times 2 =$	$25 \div 5 =$	−2	−3
$3 \times 9 =$	$24 \div 8 =$	−2	−3
$3 \times 12 =$	$24 \div 3 =$	−2	−3
$4 \times 6 =$	$24 \div 4 =$	−2	−3
$6 \times 6 =$	$21 \div 7 =$	−2	−3
$7 \times 5 =$	$22 \div 11 =$	−2	−3
$3 \times 3 =$	$20 \div 2 =$		
$2 \times 12 =$	$36 \div 12 =$	2	3
$3 \times 12 =$	$32 \div 4 =$	3	2
$9 \times 3 =$	$33 \div 3 =$	5	1
$4 \times 4 =$	$36 \div 3 =$	2	5
$2 \times 11 =$	$40 \div 4 =$	7	2
$3 \times 11 =$	$28 \div 7 =$	9	1
$11 \times 1 =$	$16 \div 8 =$		

Exercise 80

You will now learn 7 new multiplication facts. Copy each of these facts 5 times and memorize them. Change each of these new multiplication facts to two division facts, and copy in your tablet.

$7 \times 6 = 42.$ $6 \times 8 = 48.$
$4 \times 11 = 44.$ $7 \times 7 = 49.$
$9 \times 5 = 45.$ $5 \times 10 = 50.$
$4 \times 12 = 48.$

5)36	3)36	2)44	2)42	4)40	11)44
6)48	5)50	4)48	4)36	9)37	6)38
6)40	6)42	6)25	3)27	7)27	7)29
5)31	8)32	10)33	6)26	8)44	8)34

NOTE: There should be frequent drills on similar division problems. This is the best preparation for short division.

Exercise 81

In 12 feet how many yards?	1	2
In 20 quarts how many gallons?	2	2
In 24 quarts how many pecks?	3	2
In 40 pecks how many bushels?	4	5
In 50 cents how many dimes?	1	2
In 30 cents how many nickels?	3	1
In 48 gills how many pints?	2	3
In 48 pints how many quarts?	5	2
In 36 feet how many yards?	4	1
In 36 inches how many feet?	3	5
In 48 inches how many feet?	2	4
In 28 days how many weeks?	3	8
In 12 weeks how many months?	1	3
In 48 months how many years?	3	2
In 25 school days how many school weeks?	4	1
	2	3

Copy the following 5 times:

$7 \times 6 = 42.$ $3 \times 12 = 36.$

$8 \times 6 = 48.$ $7 \times 7 = 49.$

$3 \times 9 = 27.$ $4 \times 9 = 36.$

$8 \times 4 = 32.$

Exercise 82

ADDITION SQUARE

	2	1	4	7	5	3	9	6	8
5	7	6	9						
1	3	2	5						
7									
3									
2									
6									
9									
8									
4									

NOTE:—Add each number in the squares of the left column to each number in the squares of the top row. Place the sum in the square below the number of the top row and to the right of the number of the left column, as shown in the cut. Use the same plan for subtraction, multiplication and division.

Exercise 83

Add:

4	9	3	10	9	4	6	9	5	7
3	2	6	3	2	5	4	5	5	7
4	1	6	5	5	4	3	4	3	4

(1) A farmer has 10 cows, 7 horses and 5 sheep. He has —— animals.

(2) Anna has 7 dollars, Mary has 6 dollars and John has 10 dollars. How many dollars have all?

(3) James came to school 5 days in one week; 3 the next, 4 the next and 5 the next. How many days did he attend school that month?

(4) I gave 5 cents to one girl, 7 to another, 10 to another. To all I gave —— cents.

(5) If, during the week, I paid 10 dollars for groceries, 4 dollars for coal, 2 dollars for lights, and 25 cents for water, how much were my house expenses that week?

(6) A lady had 4 chairs in one room, 6 in another and 5 in another. How many in all?

Exercise 84

Add:

20	22	33	24	25	35	66
10	10	10	10	10	10	10

20	22	33	24	25	35	66
11	11	11	11	11	11	11
20	22	33	24	25	35	66
12	12	12	12	12	12	12
20	22	33	24	25	35	66
20	20	20	20	20	20	20

Adding by 10 is the same as counting by 10.

Adding by 11 is the same as counting by 10 and adding 1.

Adding by 12 is the same as counting by 10 and adding 2.

Adding by 20 is the same as counting by 10 twice.

Adding by 40 is the same as counting by 10 four times.

Exercise 85

Subtract:

12	17	15	17	13	14	13	16	17
2	9	8	8	7	8	9	8	6
10	12	6	9	11	13	16	18	15
3	7	3	5	9	5	9	9	5

(1) 18 pupils belonged to the school. 6 pupils were absent. How many were present?

(2) A man raised 20 bushels of potatoes, and sold 5 bushels. He kept —— bushels.

(3) Mr. A. bought a calf for 10 dollars and sold it for 18 dollars. Did he make any money? If so, how much?

(4) Fred bought 2 dozen oranges and sold one dozen. How many oranges had he left?

(5) Mr. B. planted 19 trees. 8 trees died. —— trees lived.

(6) Lucy had 25 cents. She gave 10 cents for a yard of lace. What pieces of money would she get in change?

Exercise 86

Subtraction

43	62	82	45	25	34	64
10	10	10	10	10	10	10
53	42	82	66	45	64	34
11	11	11	11	11	11	11
44	33	68	55	49	48	45
12	12	12	12	12	12	12
44	48	52	65	77	80	60
20	20	20	20	20	20	20

Subtracting 10 is the same as counting backwards by 10.

Subtracting 11 is the same as counting backwards by 10 and then taking away 1.

Subtracting 20 is the same as counting backwards by 10 two times.

Exercise 87

Multiply:

5	9	12	11	10	7	6	8	7
7	4	3	4	5	7	6	4	5

3	6	5	12	3	4	5	3	9
7	4	2	2	4	4	5	8	3

(1) If a street car runs 6 miles in 1 hour, in 5 hours it will run —— miles.

(2) What is the cost of 10 pounds of sugar at 5 cents a pound?

(3) What will 7 trees cost at one-half dollar apiece?

(4) 10 yards of ribbon at 5 cents a yard, costs —— cents.

(5) 4 horses at $100.00 apiece will cost —— dollars.

(6) If a boy gathers 2 quarts of berries in 1 hour, in 7 hours he can gather —— quarts of berries.

(7) At 3 cents a yard, 12 yards of lace will cost —— cents.

Exercise 88

Divide:

3)12	10)50	3)33	7)42	4)32	3)27
2)14	7)21	3)24	4)28	4)36	7)35

(1) If 7 pencils cost 35 cents, 1 pencil will cost —— cents.

(2) If 9 yards cost 45 cents, 1 yard will cost —— cents.

(3) If 9 bins hold 36 bushels, 1 bin will hold —— bushels.

(4) Mary has $1.00. How many things can she get if each one costs 10 cents?

(5) How many pounds of sugar at 5 cents a pound can you buy for 10 dozen of eggs at 10 cents a dozen?

(6) How many yards of calico at 8 cents a yard, can you buy for 4 dozen eggs at 12 cents a dozen?

(7) At 6 dollars a week, how long will it take a boy to earn 36 dollars?

Exercise 89

Add:

9	8	5	7	9	9	9	7	5	3
7	5	9	6	6	8	9	5	6	7

Subtract:

10	17	13	16	11	12	13	15	16	12
6	9	7	9	8	8	9	7	7	5

Multiply:

12	7	11	6	8	9	4	9	6	5
2	4	2	3	3	2	6	3	2	4

Divide:

18 by 9; 27 by 3; 34 by 6; 21 by 7; 28 by 4; 24 by 3; 24 by 12; 15 by 5; 18 by 2; 16 by 4.

Let pupils make concrete problems, using the above combinations.

Count by 6's to 100.

Count backwards from 100 to 0 by 5's.

Count to 100 by 3's.

Count to 100 by 4's and then back to 0.

Exercise 90

Make a clock face and learn to tell the time from it.

Use your circle-maker and draw an eight-inch circle.

Draw a six-inch circle inside.

Divide your circle into halves and quarters.

What letters will you place at the top?

What letters will you place at the bottom?

What letters midway to the right?

What letters midway to the left?

Into how many equal parts must each quarter be divided to show all the hours on the face of the clock?

Now draw a two-inch circle in the center.

Place the short hand past I and the long hand at VI. What time is it?

Imagine the long hand at IX. What time is it?

How many minutes between the numbers on the face of the clock?

$5 \times ? = 10.$ $5 \times ? = 30.$

$12 \times ? = 60.$ $5 \times ? = 15.$

Exercise 91

TEST

$6 \times ? = 30.$	$30 \div ? = 6.$	$7 + 8 = ?$
$7 \times ? = 14$	$14 \div 7 = ?$	$8 + 6 = ?$
$8 \times ? = 32$	$32 \div ? = 8$	$9 + 2 = ?$
$9 \times ? = 36$	$36 \div ? = 9$	$8 + 5 = ?$
$7 \times ? = 35$	$35 \div 7 = ?$	$7 + 4 = ?$
$8 \times ? = 40$	$40 \div ? = 8$	$9 + 5 = ?$
$5 \times ? = 45$	$45 \div ? = 5$	$7 + 7 = ?$
$6 \times ? = 42$	$42 \div ? = 6$	$6 + 5 = ?$
$8 \times ? = 48$	$48 \div 6 = ?$	$6 + 9 = ?$
$7 \times ? = 49$	$49 \div 7 = ?$	$8 + 2 = ?$
$5 \times ? = 30$	$50 \div 5 = ?$	$7 + 8 = ?$
$5 \times ? = 40$	$40 \div 8 = ?$	$2 + 6 = ?$
$3 \times ? = 21$	$21 \div 3 = ?$	$1 + 8 = ?$
$9 \times ? = 27$	$27 \div 9 = ?$	$3 + 10 = ?$
$8 \times ? = 24$	$24 \div 8 = ?$	$2 + 9 = ?$
$6 \times ? = 24$	$24 \div 6 = ?$	$7 + 9 = ?$
$3 \times ? = 30$	$30 \div 3 = ?$	$6 + 4 = ?$
$4 \times ? = 36$	$36 \div 4 = ?$	$6 + 7 = ?$

Copy the above facts.

Exercise 92

(1) Image an oblong 2 inches wide and 5 inches long. How many square inches?

(2) Image a square 5 inches by 5 inches. How many square inches?

(3) Image a square 3 feet by 3 feet. How many square feet?

(4) Image an oblong 3 inches by 4 inches. How many square inches?

(5) How many more square inches in the fourth oblong than in the first oblong?

NOTE: If you cannot image the oblongs, make them with inch squares.

(6) Add 7 to itself. Add 8 to itself. Add 9 to itself. Add 10 to itself.

(7) Double 2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15.

(8) Find $\frac{1}{2}$ of 6, 8, 14, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36.

(9) Find $\frac{1}{3}$ of 3, 6, 12, 9, 18, 21, 15, 24, 27, 30.

Exercise 93

The 45 combinations of Addition are:

1	2		3	2		4	3		3	4	5
1	1		1	2		1	2		3	2	1
2	3		4	4		5	5		6	6	6

3	5	6		4	5	6	7		5	6	7	8
4	2	1		4	3	2	1		4	3	2	1
7	7	7		8	8	8	8		9	9	9	9

5	6	7	8	9		6	7	8	9		6	7	8	9
5	4	3	2	1		5	4	3	2		6	5	4	3
10	10	10	10	10		11	11	11	11		12	12	12	12

8	7	9		7	8	9			7	9
5	6	4		7	6	5			8	6
13	13	13		14	14	14			15	15

		8	9		9		9	
		8	7		8		9	
		16	16		17		18	

Here is a happy message to the children: Learn the above combinations perfectly, and you will have no trouble with addition or subtraction.

Exercise 94

MEASURES USED IN THIS BOOK

We count —— by this table:

10 ct.	10 cents make 1 dime.	1 d.
10 d.	10 dimes make 1 dollar.	$1.

We measure —— by this table:

12 in.	12 inches make 1 foot.	1 ft.
3 ft.	3 feet make 1 yard.	1 yd.

We measure ——, ——, ——, by this table:

144 sq. in.	144 sq. in. make 1 sq. ft.	1 sq. ft.
9 sq. ft.	9 sq. ft. make 1 sq. yd.	1 sq. yd.

We measure ——, ——, ——, ——, by this table:

4 gi.	4 gills make 1 pint.	1 pt.
2 pt.	2 pints make 1 quart.	1 qt.
4 qt.	4 quarts make 1 gallon.	1 gal.

We measure ——, ——, ——, ——, by this table:

8 qt.	8 quarts make 1 peck.	1 pk.
4 pk.	4 pecks make 1 bushel.	1 bu.

Exercise 95

We measure —— by this table:

60 sec.	60 seconds make 1 minute.	1 min.
60 min.	60 minutes make 1 hour.	1 hr.
24 hr.	24 hours make 1 day.	1 da.
7 da.	7 days make 1 week.	1 wk.
4 wk.	4 weeks make 1 month.	1 mo.
12 mo.	12 months make 1 year.	1 yr.

We measure —— —— —— —— —— —— by this table:

16 oz.	16 ounces make 1 pound.	1 lb.

The following is a test on the drawings used in the book:

A line has ——.

A book or cube has ——, —— and ——.

A square has —— corners and —— sides.

A star has —— points.

A triangle has —— sides and —— corners.

A rectangle has —— sides and —— corners.

Exercise 96

COMPLETION OF MULTIPLICATION TABLE

NOTE TO THE TEACHER:—

Continue the multiplication table as far as you deem it wise.

From 50 to 144.

$5 \times 10 = 50.$	$8 \times 10 = 80.$
$6 \times 9 = 54.$	$9 \times 9 = 81.$
$11 \times 5 = 55.$	$7 \times 12 = 84.$
$8 \times 7 = 56.$	$11 \times 8 = 88.$
$6 \times 10 = 60.$	$9 \times 10 = 90.$
$5 \times 12 = 60.$	$8 \times 12 = 96.$
$7 \times 9 = 63.$	$11 \times 9 = 99.$
$8 \times 8 = 64.$	$10 \times 10 = 100.$
$6 \times 11 = 66.$	$12 \times 9 = 108.$
$7 \times 10 = 70.$	$11 \times 10 = 110.$
$8 \times 9 = 72.$	$12 \times 10 = 120.$
$6 \times 12 = 72.$	$11 \times 11 = 121.$
$7 \times 11 = 77.$	$11 \times 12 = 132.$

$12 \times 12 = 144.$

Exercise 97

1	One	I
2	Two	II
3	Three	III
4	Four	IV
5	Five	V
6	Six	VI
7	Seven	VII
8	Eight	VIII
9	Nine	IX
10	Ten	X
11	Eleven	XI
12	Twelve	XII
13	Thirteen	XIII
14	Fourteen	XIV
15	Fifteen	XV
16	Sixteen	XVI

17	Seventeen	XVII
18	Eighteen	XVIII
19	Nineteen	XIX
20	Twenty	XX
21	Twenty-one	XXI
22	Twenty-two	XXII
23	Twenty-three	XXIII
24	Twenty-four	XXIV
30	Thirty	XXX
40	Forty	XL
50	Fifty	L
60	Sixty	LX
70	Seventy	LXX
80	Eighty	LXXX
90	Ninety	XC
100	One hundred	C
500	Five hundred	D
1000	One thousand	M

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